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REPORT

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OF THE

T. B. Ferguson

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COMMISSIONERS OF FISHERIES

OF

MARYLAND,

To his Excellency, the Governor,

JANUARY 1st, 1876.

1st. ed

ANNAPOLIS, MD.
Printed at ADVERTISER OFFICE.
1876.

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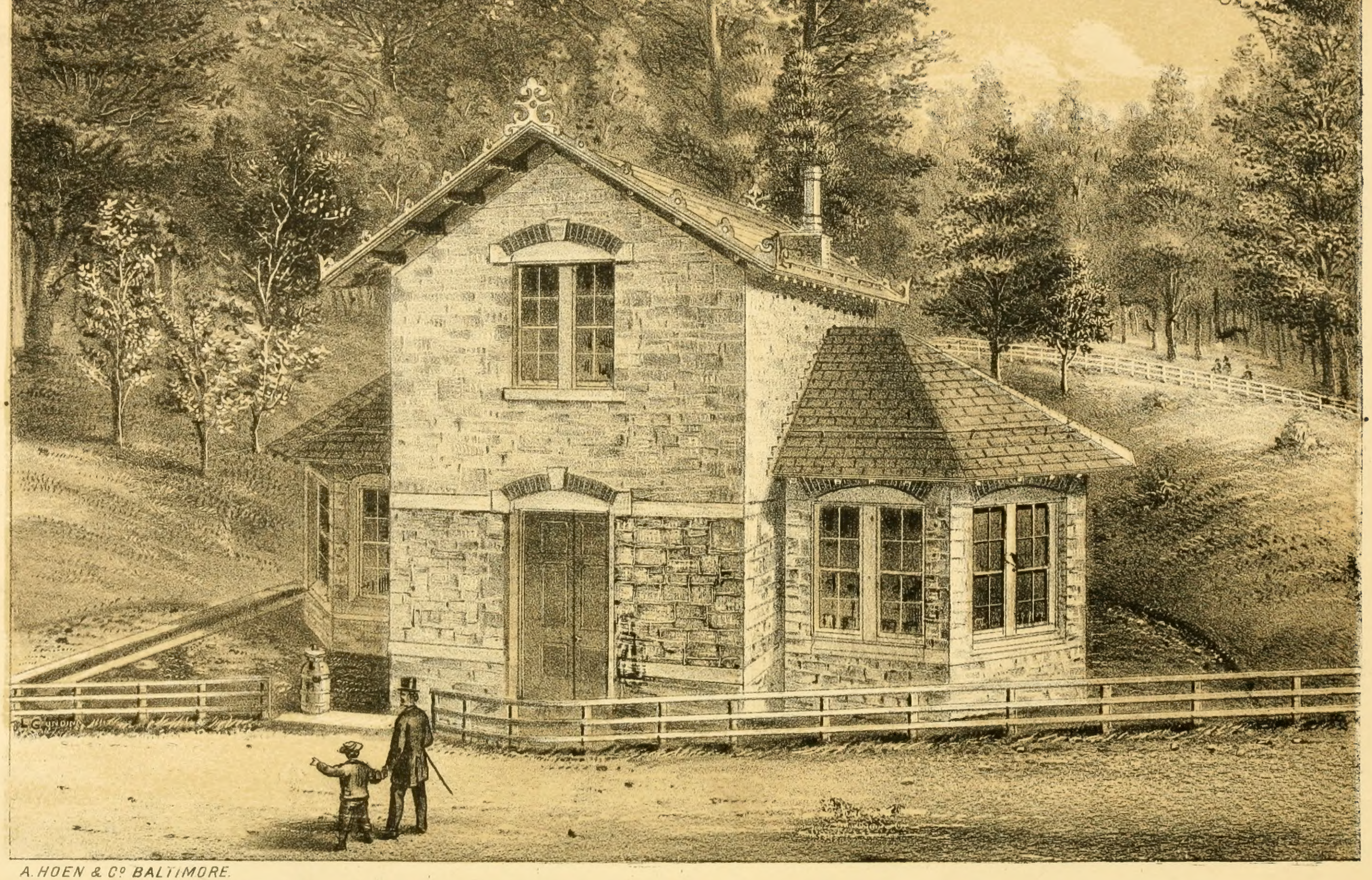

A. HOEN & Cº BALTIMORE.

DRUID HILL HATCHING HOUSE.

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To his Excellency, the Governor,

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REPORT

OF THE

Commissioners of Fisheries

OF

MARYLAND.

To His Excellency James Black Groome,
Governor of State of Maryland:

The Commissioners appointed by your Excellency in pursuance of Chapter 150, of the laws of Maryland, enacted at the session of the General Assembly of 1874, beg leave to submit the following:

We have combined the report of 1874, (not printed,) with that of 1875, that the work of the Commission, from the adjournment of the legislature of 1874, to the assembling of that of 1876, might be transmitted to that honorable body by your Excellency in its entirety. It is much to be regretted that we are without reliable statistics of the annual yield of our waters, and have only to rely on information furnished from the memory of fishermen and fishdealers, but enough has been obtained to satisfy us, that the most valuable fisheries are becoming less and less productive, and our waters are being depleted of their yield of fishfood, to an alarming extent, and we now feel that necessity for the protection of our fishes, and the resort to artificial means of fish culture to restore our waters, which has stimulated in turn, other more densly peopled countries. Most of the States have been impelled to protect and propagate food fishes in consequence of the fearful decrease in the yield of their fisheries, save the State of California, which is with great foresight, prosecuting this branch of State industry with vigor, while her waters are yet comparatively bountifully supplied.

The record, of the results obtained in other countries, and in those States which have bestowed a fostering care on their fisheries, enables us to report that we can, at no great expense, make our rivers and bays, even more productive than they ever have been, and the best food fishes more abundant than when the earliest settlers of this country commenced their destruction.

The natural geographical advantages of the State of Maryland, are so great that no effort should be wanting to make our waters, one-fifth the whole area, yield their utmost abundance. The rivers of the more Southern States are year by year becoming more and more depleted, and their unhappy condition both pecuniarily and politically renders it improbable that they will be able for many years to do anything towards the restoration of their fisheries. The spring fishes of the Chesapeake Bay, being the earliest in market, will command the most remunerative prices, and the great railroad facilities, and the improved means of transporting fresh fish to the interior, by the use of ice, and refrigerating cars, renders it impossible to so overstock the market, that the capture of our best food fishes would be unremunerative.

CO-OPERATION OF VA., ON THE POTOMAC.

Your Excellency appreciating the necessity for the co-operation of the State of Virginia, in any efforts to be made for the restoration of the fisheries of this most important and productive river, instructed one of your Commissioners to visit Richmond, the General Assembly of Virginia, being then in session, making him the bearer of a letter to His Excellency Governor Kemper, in which his attention was called to the action taken by the Stateof Maryland, for the increase of fishes, and urging concurrent action by the State of Virginia, so far as the Potomac was concerned. Your Commissioner was cordially received by His Excellency, who expressed his hearty desire for co-operation in the work, and placed him in communication with the Committee "on the Chesapeake Bay and its Tributaries" to whom the subject was referred. Your Commissioner was invited by the Chairman (General Taliaferro) to appear before the committee, and explain to them the ends which it was hoped could be accomplished. After their deliberations, the committee reported unanimously, a bill similar to that enacted by the Maryland Assembly, creating a commission, and making an appropriation for fish culture, but unfortunately for the inhabitants of the Potomac as producers, and the people of the States as consumers, owing to the adjournment of the Virginia legislature, the bill was not passed until the following session. We are happy to report that the bill became a law on the twenty-fifth day of March, 1875, and Messrs. A. Moseley, W. B. Robertson and M. G. Ellzey, were appointed Commissioners. Your Commissioners have been in constant communication with them, and have found them on all occasions ready to co-operate, to the extent of their means, in any work on the Potomac, tending to the benefit of that river.

SHAD, (*Alosa Sapidissima.*)

This being the most important of the food fishes of our waters, your Commissioners immediately on their appointment, sought for means for their increase by artificial propagation ; and the following letter was addressed to the United States Commissioner of Fish and Fisheries, Professor Spencer F. Baird, who had kindly promised his aid in this most important work.

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St.*, *Baltimore*,
9th April, 1875.

PROF. SPENCER F. BAIRD,
Commissioner General, Fish and Fisheries, U. S.
Washington, D. C.

Dear Sir:—Knowing that you are in communication with many efficient persons, expert in manipulating ripe fish and hatching the spawn, I write to beg you to secure for our commission the services of a competent person, and make the necessary arrangements for a hatching station to be established to take advantage of the spawning season of our Shad and Rock. I will select the locality at which our operations will be conducted, as soon as I return from my mission to Richmond. My absence at this time renders it necessary for me to ask your valuable assistance in this matter. As you are aware that our appropriation is very limited it is not necessary for me to ask you to make these arrangments on as economical a scale as consistent with efficiency. I have the honor to be very respectfully,

Your obedient servant,
T. B. FERGUSON,
Commissioner of Fisheries.

As it was thought that Seth Green's hatching box was covered by letters patent, and was the only one adapted to shad hatching in our waters, your Commissioners deemed it advisable to have a conference with the inventor in hopes that he would modify the terms on which he had offered the use of his boxes to the States, two thousand dollars in cash, royalty for their use for three years. We were unable to obtain more favorable terms than the following propositions:

"*Proposed memorandum of agreement between the Maryland Commissioners of Fisheries, and Seth Green of Rochester, New York, for hatching shad in Maryland during the spawning season of* 1874.

Seth Green agrees to furnish the necessary labor for manipulating the fish and the necessary implements and equipments, and perform all the work connected therewith during the spawning season for shad, furnish the necessary transportation for, and board the men employed by him for two camps, one on the Patuxent river, and one on one of the rivers of the Eastern Shore of Maryland. The Commissioners of Fisheries for Maryland, agree to furnish the fish as taken at the several camps to Seth Green to be manipulated for spawn, and agree to pay to Seth Green eleven hundred dollars, one-half of the amount, being five hundred and fifty dollars, to be paid when the camps are established, and the other one-half, being five hundred and fifty dollars, to be paid at the close of the season."

The second proposition submitted by Seth Green, was that the Commissioners of Fisheries should pay to him, six hundred and sixty-six dollars and sixty-six cents for the right to use his boxes, for one year, and two dollars per diem for men to operate them, the Maryland Commissioners to pay all expenses of transportation and board. After consultation with the U. S.

Commissioner, it was deemed advisable to decline these modified terms, as the season was then so far advanced, that the probable results would not authorize the expenditure of so large a portion of the appropriation. This letter was therefore addressed, declining to perfect either agreement proposed, viz:

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St.*, *Baltimore, Md.*,
May 21*st*, 1875.

MR. SETH GREEN, Rochester, N. Y.

Dear Sir:—I found on my return, after a careful examination of the subject, that it would not be advisable for us to expend so much of our appropriation for shad hatching, as the agreement proposed by us would necessitate, as the shad have not yet become so scarce as to make their diminution felt by our people. I hope that we will be able to arrange our expenditures this year, so that we will have a sufficient amount next year to enter into an arrangement with you, and early enough in the Spring to take advantage of the whole spawning season, which commences and ends much earlier with us than in your State. As I think the Senate will pass the deficiency appropriation bill, which has passed the House, in time for Professor Baird to commence operations next week, you will have your hands full * * * * * * *

Very truly, yours,
T. B. FERGUSON,
Commissioner of Fisheries, Md.

It was impossible to devise other apparatus suitable for hatching shad, before the close of the fishing season of 1874. Your Commissioners, however, conducted a series of experiments, and obtained information necessary to insure a success in shad hatching the following season, the results of which will be seen by a reference to the subsequent table, showing the operations during the season of 1875. Professor Baird, U. S. Commissioner of Fisheries, however, assured your Commissioners, that should the bill then pending pass Congress, making the necessary appropriation for fish culture, in time to find any ripe fish in the Potomac, he would push operations vigorously on that river. The season was so far advanced before the appropriation was made, that he was unable to operate south of the Delaware. In reply to an application for young shad from his camps on the more Northern Rivers, letters dated June 26th and 27th, were received from Professor Baird, authorizing the Commissioners to call on Dr. J. H. Slack, who would have charge of a hatching camp on the Delaware, and stating that he had been instructed to transfer as many young fish as he could to the waters of Maryland. We therefore addressed this letter, viz:

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St., Baltimore,*
June 28th, 1874.

DR. J. H. SLACK,
Dept. U. S. Commission Fisheries,
Bloomsburg, N. J.

Dear Sir:—I have received a letter from Prof. Baird, asking me to communicate with you on the subject of a supply of young shad, in case you succeed in finding any ripe live eggs. Please let me know if you have established your hatching camp yet, at what point, and with what success? I would like to run on and make you a visit, and arrange for the distribution of some young shad in our Eastern Rivers, easily reached from your camp.

I am very respectfully, &c.,
T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

To which the following reply was received:

POINT PLEASANT, PA.,
June 29th, 1874.

My Dear Sir:—Your's received. We are doing well here, though the weather is very hot, 97½° at 2 o'clock P. M., to-day. Can give you, I think, a fine lot of shad next week. Have taken in three days two hundred thousand spawn. I shall be absent on evening of July 2nd, and until July 6th, probably. Can you come up on Monday (July 6th)? as the sooner the better. I will try to have cans for you, and can send a man, if necessary, with you on your return * *

* * * * * * * *

Your's,

J. H. Slack, M. D.,

Dept. U. S. Commission Fisheries.

T. B. Ferguson,

Commissioner of Fisheries.

State of Maryland.

We therefore proceeded to Point Pleasant, but on reaching the hatching camp on the night of 6th of July, were disappointed at finding that Dr. Slack had not returned, having been detained at his home by severe illness, which prove fatal. His untimely death is thus announced in the report of tha New Jersey Commissioners: "By this event the State has lost a valuable officer, and his colleagues, an able and ardent coadjutor, In the prime of manhood, possessing a highly cultivated intellect, the bent of his intellect led him in the pursuit of Natural Sciences, especially that branch relating to pisciculture. In this he became distinguished and pre-eminently fitted for the position he held; when by exposure while in charge of a shad hatching camp on the River Delaware, under the auspices of the United States Commissioner of Fisheries, he contracted a pleurisy, which terminated fatallv on the twenty-seventh day of August last."

In the absence of Dr. Slack, the young fish, which were intended for the Maryland Waters, were turned into the Delaware River by the fishermen. After waiting for a few days in the neighborhood, we found it impossible to overcome the indisposition on the part of the fishermen to the young fish being removed to other waters, and were compelled to return without the hoped-for shad. Thus ended the efforts of the Commission to increase this most valuable fish in the year 1874. All efforts tending to stocking and re-stocking our rivers with this and other migratory fishes, is hypothecated on the theory of their return as adults, for the purposes of reproduction, to those rivers in which their minority had been passed. The heretofore accepted theory, that shad formed in an immense school, on the Southern Atlantic Coast, which sending off divisions as it moved northward up the several rivers successively, from Florida to Nova Scotia as the season advanced, is no doubt incorrect, for the more Southern Rivers do not continue their abundance, but those rivers formerly abundant which have been exhausted by overfishing, or obstructions preventing the fish from reaching their spawning grounds, continue unproductive, irrespective of their geographical positions, and those rivers in which artificial propagation has been resorted to, continue year by year to be more and more productive. The immense numbers and the extreme delicacy of the shad, which prevents their being handled, and the probable length of time which they remain in the sea, has rendered it impossible to ascertain with that accuracy, with which the motions of the salmon have been determined by marking them, but, it is reasonable to take it for granted, that the same natural laws govern the shad in their migrations. It has been ascertained by marking the salmon in various ways, such as cutting off the adapose dorsal fin, when they are preparing for their first visit to the sea, and by attaching tags, etc., that the salmon invariably return to the rivers in which they were bred. We, therefore report, that the best means to re-stock our rivers, would be to establish hatching stations on as many of them as spawners can be obtained, and the fish should be turned into the streams as high up a practicable, and that the maximum amount of ova be collected each year. To accustom the young fish to the upper waters, and to create in them a desire to ascend to the sources of our rivers, in case fishways are erected to provide their passage over the Great Falls of the Potomac, and other obstructions on the Potomac and Gunpowder, we transported and turned into the Potomac, at Piedmont, some sixty thousand young shad, and into the Gunpowder, near Cockeysville, some thirty thousand. Should efficient fishways be erected, the survivors will return to the upper waters of these streams when adults for the purpose of spawning, and they will become plentifully stocked with this and other anodromas fishes.

As the appropriation did not admit of our establishing more than two hatching camps for shad, we sought the aid of the U. S. Commissioner on the Potomac River, that we might devote the means at our disposal to those rivers, entirely within the limits of the State. Prof. Baird generously agreed to furnish the men and means to operate two hatching stations on the Potomac. To enable us to select proper localities, and make the necessary preliminary examinations, he secured from the Secretary of the Navy, the detail of the U. S. Steam-tug Triana, Capt. L. S. Cook, commanding, and invited the Commissioners for Virginia, just appointed, to accompany us. On the 29th of April we sailed from the Washington Navy Yard, Prof. J. W. Milner, Dep. U. S. Commissioner, representing Prof. Baird; Mr. T. B. Ferguson, the Maryland Commission; and Messrs. Robertson and Moseley, that of Virginia. We examined the fisheries on the Potomac, and then ascended the Patuxent, as far as Bristol, examining the fisheries on that river. We found Freestone Point, lying between Powell's and Neabsco Creeks, admirably adapted for shad hatching; being an excellent shad fishery, the ripe fish apparently selecting the extensive flats at this point for spawning, and Powell's Creek furnishing a safe harbor for the hatching boxes, protected as they would be from the north and north-west winds. The railroad, with a regular station at the creek, furnishing easy communication with Washington. It was therefore decided to commence operations at that point, having obtained permission from Mr. Jacob Faunce, to procure the spawn from the ripe fish taken in his seine. Moxley's Point was also selected as a suitable location for a second camp. This fishery is located at the mouth of the Piscataway Creek, and operated by J. Skidmore. The success of the U. S. Commission at Jackson's City two years previous, indicated that as a proper point later in the season. We are indebted to the U. S. Commissioner for the details of the success of his operations, as shown in Table "A."

In visiting the several fishing shores during the fishing season, we explained the object of the commission, and when ripe fish could be obtained, illustrated the manipulation of the spawn; we found the fishermen hopeful of the results to be obtained. As it may be a matter of much interest to those who have not had an opportunity of seeing our operations, we give a detail description of the process, and the kind of apparatus used. We are indebted to the Report of the

United States Commissioner for this description of the "Seth Green shad hatching box," which was used by us during the season of 1875, and as the methods employed were substantially the same, as those described by Professor Milner in the Report of the U. S. Commission, we reproduce his concise description, viz:

"The apparatus devised by Mr. Green was merely a light pine box, 22 inches long, 15 inches wide, and 12 inches deep; the bottom was wire cloth, about twenty wires to the inch. It was used without a cover. On the ends of the box, two pieces of two by four scantling were nailed diogonally to the lines of the box, so that floating in the water it was slightly tilted, the side of the box sunk to the least depth, being up stream, so that the wire screen bottom was presented to the current at a slight angle, sufficient to produce a circulation of the water inside of the box, that kept the light shad eggs in gentle motion. In a sluggish tide current the floats are usually nailed on so that from the upper edge of the box to the top of the float in front, there is a distance of 5 inches, and from the upper edge of the box to the top of the float behind, there is 2½ inches. The angle of the floats is, of course, less for a more rapid current, the object being to produce a current that will move the eggs as gently as possible, a more rapid motion being regarded as injurious, especially in the later stages of development when it materially hastens the rupture of the shell membrane, and effects a too premature birth. The wire screen bottom is coated with coal tar, or what is better, asphaltum varnish, both for the purpose of preserving the wire cloth, and for a supposed effect in retarding confervoid growth.

"As soon as the bag of the seine comes near the shore, the fishermen, gathering the lead line and cork line in their hands, gradually work it up to the top of the water, shaking the fish into the bunt of the bag, a boat is brought alongside, and the fish thrown into it with a scoop net, the shad being at once separated from the other species. The operators provided with ordinary six-quart milk pans containing about three-fourths of an inch of water in the bottoms, are in the boat, and taking up the shad one by one, detect at once, by a gentle pressure on the belly of the fish if the spawn is ripe by its free emission from the oviducts. In an unripe one the eggs will not flow at all, and if the eggs are only nearly ready, the extrusion is difficult and in masses, and the fish is rejected. When a female is found, from which the eggs flow in a liquid stream when a gentle pressure is applied, it is carefully taken in the hands of the operator, the left hand applied closely around the tail, and the heed of the fish crowded against his body, while with the right hand, a slight pressure is applied with the thumb and finger to the abdomen of the fish, and a stripping movement executed which causes the eggs to flow rapidly into the pan. As soon as it is evident that the spawn is all obtained, the shad is thrown into the basket, it being impossible to preserve the lives of so a delicate fish, even if the utmost care is taken in handling it, but though they are delicate in this particular, and have a very slight tenacity of life when taken from the water, they are a very muscular fish. Experts in fish culture, who handled the white fish and salmon-trout of the lakes, regard them much stronger than the same sized fishes of either of the latter species, and if the utmost pains is not taken to prevent their releasing themselves from the hold, they will flounder and splash in the pan of eggs, and probably throw a large portion out, and damage some of those that remain. In stripping down the abdomen, a great many scales will be removed from the sides of the fish, these if carelessly allowed to fall into the pan, will be an annoyance, as the eggs will adhere to them. They can be gathered and thrown away by an adroit movement of the hand, with a little experience, without making any delay in the operation of stripping the fish. The ova from the female being collected in the pan with a small quantity of water, a slight pressure on the ripe male near the anal opening will force out two or three jets of the milt, which falling into the pan is stirred by a gentle movement of the hand with the fingers spread, care being taken to keep the fingers from contact with the sides or bottom of the pan, as in that case some of the eggs would be crushed. The milt being diffused throughout the water, the pan is left for a few minutes to allow the spermatozoa to come in contact with the eggs. The pan should then be filled full of fresh water, and gently swayed until the water charged with milt is thoroughly mixed with the fresh water, and the eggs slightly rinsed, when soon afterwards the water may be poured nearly off and the pan refilled with fresh water, and after a slight and always gentle rinsing up of the eggs, the pan may be allowed to stand for several minutes.

The fact has been referred to that the eggs were not discernible to the touch when put into a pan, nor is there any change in this particular if no milt is added, at any rate for the length of time that the eggs have been observed in this condition, a half hour or more. For about twelve or thirteen minutes, when the temperature of the water was about 70° after the milt was added no change was observed, but about this time a careful movement of the fingers in the pan discerned their presence, and in a little more than twenty minutes from the time the milt was applied, they were felt like shot against the fingers, and to an experienced eye, were observed to have increased slightly in size. This stage of their condition is known to fish breeders as the "spawnrising," referring to the greater bulk in the pan from the increase in size of each egg." "The increase in size and hardness continues for several minutes, during which the water is poured off, and fresh water is poured into the pan two or three times, and the eggs gently stirred with the fingers. In pouring in the water the edge of the dipper is placed against the sides of the pan, and the stream directed between the eggs and the sides of the pan, as it is likely to damage the eggs if poured directly down upon them. Mr. Green estimates the number of ova taken from an average spawner, at about 20,000 eggs, and rarely estimates above 28,000 for the most prolific shad. Mr. C. C. Smith, operating for the Connecticut State Commission, estimates an average good spawner, at 50,000 ova. We have not made a test of these estimates, and are not prepared to offer an opinion with reference to the disagreement."

We used wire cloth of twenty-two wires to the inch, instead of twenty, as we found that whereas twenty wires to the inch would confine and protect the shad egg, which is about one-tenth of an inch in diameter, that the young fish would escape and become a prey to the numerous minnows that swarm around the boxes during the day. In estimating the spawn taken during our operations last spring, we followed the method adopted by Seth Green, preferring to be within the mark, and we believe that fully the amount estimated in the tables were turned loose into the streams.

The roe of the shad, as it is served on the table in a compact solid mass early in the season, is a most delicious relish, it is then far from maturity, but it becomes mature as the season advances, and the eggs become larger and more detached from the general mass, the more mature eggs differing in appearance, being more transparent, and losing their golden hue, until when ready to be spawned, the mass has lost its compactness, and the eggs are all detached, and are not palatable. When the roe has reached this stage of development, it is ready for the fish culturist, who by taking these otherwise worthless eggs from the fish en route to market, by care and attention produces the numberless fry, which in time will replenish the waters, which have yielded so liberal a supply of food to our people in years gone by. During the year, we selected three intelligent men, whose occupations had well fitted them for the various duties connected with fish culture, and carefully trained them in handling and transporting fish, and on the approach of spring secured the services of Mr. Alex. Kent, whose experience in the propagation of the fish of the salmon family, well fitted him to take charge of a hatching camp, but to insure the success of our operations, we deemed it advisable to secure the services of one who had had several years experience in hatching shad, as the treatment of the spawn is somewhat different from that of those fishes with which those in the employ of the Commission had been exercised. The proposition contained in the following was therefore made to Seth Green, under whose skillful guidance several men had been made expert in shad hatching:

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St., Baltimore, Md.*
Feb'y. 26th, 1875.

MR. SETH GREEN, Rochester, N. Y.

My Dear Sir :—I hope you have duly considered the proposition made you by me in New York, a few days since, which I now repeat with the request that you give me your answer as soon as practicable, as I am anxious to perfect all of my arrangements for the spring's work. I mentioned to you, that I do not feel authorized under the circumstances, and with the present developments in fish culture, to purchase for the State of Maryland the right to use your patent, but as I think perhaps the boxes used by you are more convenient and perfect than any of those since devised or patented, and being desirous to secure your friendly co-operation and good will, I offer you the sum of five hundred dollars, ($500.00,) the extent which our appropriation, etc., permits. In consideration of which amount, you to furnish, for our service in propagation, a practical fish culturist, experienced in taking the spawn of shad, and hatching the same, for the spawning season of Shad and Rock in Maryland waters this spring. You to pay the wages as agreed upon between himself and you, and should we use the boxes, such as used by you in shad hatching, you are not to make any additional claim against the State of Maryland. We to pay all the necessary expenses incurred for this practical fish culturist, from the time he reports, until discharged by us in Baltimore. I have just received drawings of the box patented by Mr. O. N. Bryan, of Maryland. What do you think of it?

Very truly, your's,
T. B. FERGUSON,
Commissioner of Fisheries,
State of Maryland.

Rochester, N. Y., March 3rd, 1875.

MR. T. B. FERGUSON,

Dear Sir :—Your's of February 26th, was received. I want to see the work go on in your State. I think I will furnish you a practical man and the right to use my shad hatching box this coming Spring, for five hundred dollars, ($500.00,) I to pay the man's wages from the time he leaves here, and you to pay all other expenses from the time he leaves here and returns. You to sendme a check for two hundred and fifty dollars on the arrival of the man, and two hundred and fifty dollars more when the work is done. I see by your reports that shad hatching lasts about 40 days, the man's time should be limited. We can fix that. Let me know if you comply with the above, I will give you a prompt reply, and whether I will do it or not.

I have a full description of O. N. Bryan's shad hatching box before me. It was sent me by Mr. Bryan. It is a direct infringement on my box, and is nothing like as good. It is a clumsy affair, and you can make five of my boxes for what one of his costs, and one man can take care of three times as many of my boxes as he can of his. It is a great deal of work to keep his boxes clean. Look at the complication of his, and the simplicity of mine, and judge for yourself.—There are points in my box that he uses in his, and I don't think he dare use his. There are a number of things in his drawing, that I don't believe could be put in his patent.

Your's,

Seth Green.

Maryland Commission, Fish and Fisheries,
192 *N. Charles St.*, *Baltimore, Md.*

March 8th, 1875.

Dear Sir :—In making you the offer of five hundred dollars, I expected it to cover all expenses, save board, lodging and transportation of man after he reported here. His expenses from Rochester and back, a small matter, I will agree to pay, I am also perfectly willing to make payments as you desire, two hundred and fifty dollars when the man reports, and two hundred and fifty dollars when the work is done. I don't know that I shall want him so long, but will limit his service under our contract to two months. I of course do not wish him longer than we can hatch fish. I think we have come near enough together this year to close, so let's hear from you—Yes or no. The weather continues so cold in the Bay, that I fear we will have a short and late season.

Your's truly,
T. B. Ferguson,
Commissioner of Fisheries.

Seth Green, Esq.,
Rochester, N. Y.

Rochester, N. Y., March 11*th*, 1875.

Dear Sir:—I accept of your offer, and will send a man when you say the time for him to come. Can you get iron wire sieving, twenty two wires to the inch, twenty-one inches wide? If so, let me know, and if I can get it cheaper here. I will do so for you. All that is necessary for an outfit except the lumber, is wire sieving and rope for anchors, stones and twine to tie the boxes together, and gas tar to tar the sieving and boxes. It is best to have the man come in time to make the boxes. I will get all of the above or any part of them that you wish; I consider the contract closed, and will send one of my men when you order.

Your's,
Seth Green.

T. B. Ferguson, Esq.,
Commissioner of Fisheries, Md.

Maryland Commission, Fish and Fisheries,
192 *N. Charles St., Baltimore, Md.*
March 29*th*, 1875.

Seth Green, Esq., Rochester, N. Y.

Dear Sir:—On receipt of your's of the 11th inst., closing our contract, I put my men to making boxes, so as to have everything ready. How many do you think we will need? How many have you been able to use at your camp on the Hudson? The twenty-two inch cloth costs sixteen cents per square foot here. I think when we priced it in Rochester, it was somewhat less.

Your's truly,
T. B. Ferguson,
Commissioner of Fisheries,
State of Maryland.

P. S. We are observing the development of the spawn, and as soon as it approaches ripeness, I will telegraph for your man. What is the name of the man you have detailed for me?

Your's,
T. B. Ferguson,
Commissioner of Fisheries,
State of Maryland.

We wrote for the man on April 14th, and Oren Chase, of Rochester, reported for duty on the 20th of April.

Mr. Oren Chase was provided with as complete an outfit for shad hatching as the appropriation would permit ; Hatching boxes which had been prepared after Seth Green's model, sufficient to hatch a half-million of eggs daily if the spawners could be obtained, all of which were placed on the Steamer "Leila," Capt. Jesse K. Hines, who had been instructed, through the courtesy of the Oyster Police Board, to render the Commission any assistance in his power. We beg leave here to express our obligations to the Board for assistance they have from time to time cordially rendered, and to Capt. Hines for the agreeable and efficient manner in which he has carried out their instructions.

Mr. Chase, with his assistant, was transferred to the Schooner "Louisa Whyte," Capt. John Forrest commanding, at the mouth of the Patuxent, and was instructed to make a thorough examination of the fisheries of this river, and report their condition, and if Bristol was found most advantageous, to establish himself there, and take advantage of the first ripe fish. Bristol had been selected as a point for our operations the previous year, as we found on examination that a considerable number of fish were taken at that point.

As the flat opposite to the wharf was found to be what the fishermen term a "splash" or "shad" wash, we hoped to secure a good many spawners. The shad, spawning generally at night, select shallow water, and in pairs, male and female running side by side, come suddenly out of the water as the female deposits her spawn, and the male ejects upon it the milt. This causes a splashing, and the fishermen denominate the locality as "splash" or "shad wash." They are generally the most successful as localities for hatching camps. A tabular statement of the operation conducted by Mr. Chase is herewith submitted. We are under obligations to Mr. W. E. Sunderland, the owner of the fishery, for the many facilities which he rendered us in procuring the spawn from the fish taken in his seine. About the same time that Mr. Chase was located on the Patuxent, we sent Mr. Alex. Kent to Coppage's Landing, on the Chester, with the necessary equipments for shad hatching. A detail record of his operations will be found in Table. We are under many obligations to Mr. A. Albert, and the officers of the Chester River Steamboat Company for free transportation of ourselves, assistants and stones, and for many acts of courtesy.

It will be seen by reference to the tables, showing operations at the several camps, that little or no success is attained when the water continues below sixty degrees, and after it had risen above eighty-three degrees, showing that the temperature of the water exercises an important influence on the development of the eggs, which do not seem to be matured sufficiently to be spawned, until the advancing spring has caused a rise in the temperature of the water. Again, on the increase of heat towards the middle of June, the eggs were either found dead in the ovaries, and without the capacity for fecundation, or after impregnation, died in the boxes, thus shortening the season in which operations can be successfully conducted.

The mortality which was noticeable in these eggs taken at the close of the season, might be attributable to the heat of the surface of the water, and the increased power of the sun. This might be remedied by submerging the hatching boxes.

Coppage's Landing,
June 10*th*, 1875.

T. B. Ferguson, Esqr.

Dear Sir:

* * * * * * * *

We have taken about five hundred thousand eggs this week, all of which have looked as well the morning of the second day as the lot you saw when you were down here. But, after they have been in the boxes twenty-four hours or more, a white spot appears on a very large number of them. I have not yet been able to discover the cause. There are hundreds of fish playing about the bottoms of the boxes trying to suck the eggs through. Whether the injury is to be attributed to them, I cannot say. Wroten thinks the water is poisoned with the drainage of fields, and the grasses growing and decaying. Should the lot taken last night do better than those taken previously, I will attribute it to the late rain. The catch of the seine last night was sixty-nine. That of the gillers light. We got nine or ten spawners in all.

Your's, very truly,
ALEX. KENT.

On receipt of this report from Mr. Kent operating at Coppage's Landing, the instructions below were given.

MARYLAND COMMISSION, FISH AND FISHERIES.
192 *N. Charles St., Baltimore,*
June 11*th*, 1875.

MR. ALEX. KENT, Coppage's Landing,
Dear Sir:

* * * * * * * *

I have been thinking of the probable causes of the loss of eggs, which your report mentions, and think it might be from the heat of the sun upon the surface of the water. I wish you would try the experiment of submerging a box of eggs, so that they would not be so near the surface of the water. You might do this by taking off the floats from the box you put the eggs in, then fasten another box on as a cover, to prevent the egg coming out. Remove the floats of the top box, nearer to the top, and put it in the stream. The floats should be arranged to cause the bottom of the lower box to be inclined to the current like the figure below. I wish I had thought of it sooner, I would have liked to have tried some of my jars, and if it was not so late, would send you some of them with a tank to use as a reservoir.

* * * * * * * *

Very truly your's
T. B. FERGUSON,
Commissioner.

The fishermen suspended operations at this time, and we were unable to procure any more ripe fish, so had not an opportunity of making the experiment.

By the courtesy of the owner of one of the largest fisheries in the Upper Bay, we examined his well kept books, and found that in 1824, when he worked a seine of only five hundred fathoms, his catch of shad during the season ending May 24th, amounted to fifty-two thousand six hundred and seventeen, whereas, in that of 1871, he took with a seine, one thousand one hundred and fifty fathoms, only seventeen thousand eight hundred. The catch last year was considerably larger, as it was the best shad season for many years. On the 8th of May, his catch was twenty eight thousand four hundred and nine. The diminution in shad is even more marked than would appear from the above statement, for we learned that twenty-three fisheries above the mouth of the North East, which were in operation some forty years ago, have been abandoned.

It was impossible for us to estimate the number of gill nets fished in this locality, but at night, the river was illuminated by a thousand lamps, presenting the appearance of a moving city.

We observe that the ripe males or milters made their appearance in advance of the ripe females, and were much more abundant early in the season. Quite frequently towards the close of the season, we found numbers of ripe females, and after taking the eggs, were compelled to abandon them for want of milt to impregnate them. In some cases we used the milt from the Herring, and we also impregnated one or two lots of eggs with the milt from the Rock. After hatching as we had no means to keep them that their development might be observed, we released these Hybrids.

THE HERRING—(*Promolobus pseudo harengus.*)

This fish is scarcely less important than the shad, and should receive the fostering care of the State. The fecundity of the Herring is so wonderful and their numbers so immense that, it would seem only necessary to protect them, so that they might reach proper spawning beds The eggs are much more adhesive than those of the shad, and more difficult to handle, but much can be done towards their increase, by artificial propagation. The spawning season commencing and ending somewhat earlier than that of the shad. Fishing with the herring net should be discontinued earlier in the season.

THE ROCK, OR STRIPED BASS—(*Roccus Lineatus.*)

The aggregate number taken during the year, the high price which it commands in our markets as well as its game qualities, and the excellent flavor of its firm flesh, places this among the most important of our native food fishes.—We have made several efforts to obtain reliable statistics of the number of pounds annually produced in the Chesapeake Bay and its tributaries, for we believe that the value of this fish, and the amount of its contribution to the food resources of our State is much underestimated. Though true that it is not at any time taken in such great numbers as the shad and herring, yet its season extending through a greater portion of the year, the aggregate yield makes it of scarcely less importance than these fishes.

They are migratory to some extent in their habits, but it does not appear that they are impelled by the same necessity' for fresh water, for the purposes of reproduction, which causes the above mentioned fish to visit our rivers yearly.—We are inclined to believe that their appearance is rather in search of food. They are taken of great size in the shad and herring seines, and are called "herring rollers" by the fishermen who make war upon them, as they believe that they consume a great many shad and herring. We doubt very much the wisdom of this warfare, for even if the Rock was of no value as food, its predatory instincts must cause it to play an important part. Following the schools of shad and herring, they consume the less vigorous which become their easiest prey, leaving the strong and most vigorous to perpetuate their race. There seems to be a peculiar need for this weeding out by predatory fish, as the shad and herring are not combative as many other species with whom the favors of the female are often the prices of hard fought battles.—We in visiting the several fishing shores examined hundreds of Rock, but could not find a single ripe female, and instructions were given Messrs. Chase and Kent to observe this fish closely. They however met with no better success. We found many ripe male fish, and as early in the season as the 27th April, and as late as the middle of May. The milt was used to fecundate the eggs of the shad, when milt shad could not be procured. The fact that milters are found in April, would indicate that they spawn about that time, or perhaps later, as with shad and other fish, the milters are found ripe in advance of the roe-fish.

We deem it of the greatest importance, that the time of spawning be accurately determined, and if possible the character of spawning beds, etc. To enable us to procure the ova and increase this fish, we propose to select a suitable locality, procure the fish in their first abundance in February and confine them until their eggs are developed. Although impracticable for shad, this can be accomplished at no great cost. At the Bucksport establishment, the Salmon are taken in the shore seines in the Spring, transferred to a fresh water pond, and kept until ripe in the Fall, when the eggs are taken and hatched. In this way we confidently hope to be able to procure and develop many millions of Rock during the coming Spring.

THE WHITE PERCH—(*Morone Americana.*)

This excellent pan fish is well and favorably known in our markets, it is still very abundant, but steadily diminishing notwithstanding its great fecundity. The spawning season being somewhat earlier than that of the shad, and different localities required as well as modified hatching apparatus.—We did not feel warranted in incurring the additional expense of a separate hatching station. We however made a successful experiment in hatching them, and are satisfied that they can be greatly increased by artificial propagation.

THE BLACK BASS—(*Micropterus Salmoides.*)

Though of recent introduction into our waters, it has become so plentiful, and plays so important a part in the food supply of the interior of the State, that we refer to it among the native fishes. The black bass has not, nor is it likely that it will be so constantly found in our markets, as those fish which find their substance and obtain their growth in the sea, where they find an inexhaustible supply of excellent food. But the bass fills, and well fills a long felt deficiency of fish food in the interior fresh water, occupying the middle ground between the rapid leaping brook, the home of the speckled trout (Salmo Fontinalis) and that frequented by the white (Morone Americana) and yellow perch (Perca Flavescens) They furnish a wholesome fish diet, and recreation to those who had before their introduction only the Cat (Amiurus Albidus) the Sucker (Catostonuss Communis) the Fall fish (Simotilus Rhotheus) and a few minnows.

Although never taken in sufficiently large quantities to be found in central markets, yet there are hundreds of families residing in the region drained by the Upper Potomac, who are saved thousands of pounds of meat annually by the introduction of this wholesome change of diet. We, through the kindness and aid of Hon. Arthur P. Gorman, President of the Ches. & O. Canal, who rendered us every facility, when the water was taken from the canal in December, 1874, procured some five hundred black bass, many of them large fish, with which we stocked many of the rivers. We hoped to procure a much larger supply, but when we recollected that the abundance in the Potomac is the result of the introduction of not more than one hundred in 1854, we may expect excellent fishing in the streams stocked in four or five years, if the fish are protected. It has been asserted that they had destroyed all other fish, and were themselves diminishing, we, however, found quantities of small fish in seining the deep places in the canal, and but few bass. We attribute the diminution of the bass in some of the upper waters to the fact that on the approach of cold weather, they move down stream, seeking the deep holes in which they lay dormant during the winter. Having passed over the dams and Great Falls in their downward journey they find it impossible to return, so the upper regions are each year deprived of many of their fish. There would be a more equal distribution if these obstructions were provided with proper fishways.

TROUT, (*Salmo Fontinalis.*)

This fish, so much prized by the angler and epicure, inhabits the clear mountain streams and rippling brooks, in which there is to be found a limited supply of food. This renders it impracticable to make them so plentiful, as to have any influence on the food product of our waters.

This consideration decided us not to devote any portion of the appropriation to stocking streams with this beautiful fish, but to devote our means to multiplying those larger, more prolific and more easily raised fishes which find their food in the ocean, and waters more abundantly supplied with insects, and crustacea, that we might accomplish the greatest possible results. We have received constant applications from all parts of the State for trout for streams and ponds fed by cold springs, so we have made preliminary arrangements should the necessary means be placed at our disposal, to distribute from fifty to seventy thousand trout immediately. Our hatching facilities are such that we can at little or no additional cost, turn out hundreds of thousand fry yearly, should we be enabled to procure storage ponds for the breeding trout.

The cultivation of the lands which are drained by trout streams, has in our opinion tended greatly to destroy the trout, almost as much as excessive and indiscriminate fishing. The eggs of the trout are of considerable specific gravity, and are deposited on the gravelly beds in the brooks during the latter part of October, and in the month of November. They are hatched in this latitude in from forty to sixty days, during which time they are constantly exposed to the danger of being covered up and smothered with mud washed down from the newly ploughed surrounding fields, nor does the danger from the washing of the fields end with this period of the development of the egg, for after the young fish has freed itself from the egg, it is almost as helpless during the absorption of the umbilical sack. We have in wading trout streams in Howard Co., sunk ankle deep in mud washed in from the surrounding ploughed fields.

The washings are more fatal to the eggs of the Salmonidæ than perhaps any other, as they, after depositing their eggs leave them, whereas the black bass attend their nests, keeping them clear of sediment by a gentle movement of the fins, until the offspring are free from the egg, and able to take care of themselves. The length of time required fer the development of the eggs, renders it quite improbable that the streams in highly cultivated farms will ever become abundant with trout even if all fishing was stopped, unless the eggs are artificially hatched.

We are of opinion that the only effective method of keeping up trout streams, is to hatch out yearly and keep until the sack is absorbed a sufficient number of trout, and turn them into the stream. This can either be done by the State from its central hatching house, or by individuals living on such streams.

THE BROOK TROUT—West of Rocky Mountains—(*Salmo Indea.*)

We received a few eggs of this variety of the Brook Trout, which differs from our "Salmo fontinalis," in that it is marked with black spots instead of red. This fish is described as being ot delicious flavour, it rises boldly to the fly, takes it greedily, is active, plump, and affords good sport to the angler. The eggs were received from California by Professor Baird, through the mail, and remailed to Mr. Ferguson in Baltimore. They were successfully hatched in his library, and have been placed in a pond in Druid Hill Park, which had been prepared by the Park Commissioners, for fish culture, near the "Crow's Nest." Many of them were washed away by severe rains before the completion of the ponds. The remaining fish are doing well and growing finely, perhaps more rapidly than their cousins of the Atlantic slope.

SALMON—(*Salma Salar.*)

Prof. Baird having presented the State with eighty thousand salmon eggs, from the Bucksport breeding establishment, which is operated by the U. S. Commissioner, and the Commissioners of the New England States, and superintended by Mr. Charles G. Atkins, we placed them under Mr. Kent's care, at his hatching house at "Green Spring," and when ready for distribution, disposed of them as appears in the table. We are not hopeful of any results, as this variety is an inhabitant of much colder waters. Those which we have kept over, have not thrived as the Western variety have.

THE SALMON OR LAKE TROUT—(*Salmo Namaycush.*)

We obtained a few thousand eggs of the Salmon Trout from the State of New York, some of which were hatched at the mansion in Druid Hill Park, by permission of the Park Commission, but unfortunately, during the severe cold in February, the pipe which furnished the jars with water froze, and the fish and eggs were all lost. Some two thousand were successfully hatched in the library of one of your Commissioners in Baltimore, and about one thousand of the young fish were placed in Druid Lake by permission of the Water Board—the others were placed in small streams tributary to the Gunpowder, in Baltimore county. The growth of those kept over from last year, has induced your Commissioners to make the experiment of the introduction of the Salmon Trout on a larger scale. We, have therefore, obtained some forty-five thousand ova from Seth Green, Superintendent of the New York Commission, which are now in the hatching house in Druid Hill Park.

LAND LOCKED SALMON—(*Salmo Tobago.*)

The game qualities of this fish, which resembles the Maine Salmon so closely, that it is still an undetermined question with Naturalists, whether it be a separate species, have induced your Commissioners to request some ova from the U. S. Commissioner, that their introduction may be attempted. Prof. Baird has promised to present us with a lot of the eggs, should he be successful in procuring a supply. This Land Locked Salmon attains the size of from six to eight pounds, is of excellent flavour, takes the fly readily through a good portion of the year, and is perhaps the gamest of his family.

CALIFORNIA SALMON—(*Salmo Quinnant.*)

This is the most important of the fishes which have been unknown to our waters, and have been introduced by us.

We have expended a large portion of the appropriation, and devoted much care and attention to stocking our streams with this most valuable fish, as we have every reason to believe that their naturalization is entirely feasible, and our efforts will be crowned with success. The habits of this fish will cause its successful introduction to be felt by the greatest number of the people of the State, and throughout the entire course of the streams, from the Bay to their mountain sources. On their return in the Spring from the sea, where they attain their growth and excellent flavour, they will be taken at the mouths of the rivers, and throughout the regions of tide water, in nets and seines, and those which escape and reach the upper waters, which they select for spawning, will remain until Autumn, when they deposit their spawn and return to the sea. During their sojourn in fresh water they will be taken by anglers. In tables following, will be found a statement of the number of California Salmon turned loose in the waters of the State, from which it will be seen that in the winter of 1874, we made a very general distribution into the rivers of the State having their sources in the mountain regions. The few thousand which were placed in the rivers of the Eastern Shore, whose sources are in the more level country, were simply an experiment without hopes of success, but from some experiments made during the year with the California Salmon, we are almost hopeful of success even in these rivers. As the San Joaquin valley is about isothermal with the Savannah, we believe that the Salmon will not suffer for want of cold water in the Potomac, Patuxent, Gunpowder and Susquehanna. We quote from the report of the Commissioners of Oalifornia for 1874 and 1875, showing the results obtained from their labors, and the importance of this as a food-producing fish.

"Salmon were more plentiful in the Sacramento river during the season 1875, than ever before since Americans had knowledge of the country. This is attributed to the close season which prohibits the taking of Salmon between the first of August and November first, as also to the quantities of young Salmon turned loose from the hatching establishments. It is anticipated that after three years there will be found more profitable fishing than has hitherto been known. An appropriation of from six to ten thousand dollars yearly, is asked for instead of the pittance of twenty-five hundred dollars granted."

Much attention is given to the Sacramento Salmon (Salmo quinnat) by scientists and by fish culturists in other countries for the reason that it comes into rivers to spawn in latitudes much lower, and in waters much warmer than any other variety yet known. Large numbers pass up the San Joaquin River for the purpose of spawning in July and August, swimming for one hundred and fifty miles through the hottest valley of the State, where the temperature of the air at noon is rarely less than 80° Fahrenheit, and where the average temperature of the river, at the bottom, is 70°, and at the surface 80°. The Salmon of the San Joaquin River appear to be of the same variety as those in the Sacramento, but average smaller in size. Their passage to their spawning grounds at this season of the year, at so high a temperature of both air and water, would indicate that they will thrive in all the rivers of the Southern States, whose waters take their rise in the mountainous regions, and in a few years, without doubt the San Joaquin Salmon will be transplanted to all of those States."

"The weight of Salmon caught during the past season in the waters of the Sacramento and San Joaquin Rivers, is estimated at 5,098,780 pounds, in addition to 92,000 pounds of fresh Salmon shipped in ice to the New York market."

We received in October, 1874, about two hundred and fifty thousand eggs of the California Salmon, a gift to the State from Professor S. F. Baird, U. S. Commissioner, from the eggs collected under his direction, by Mr. Livingston Stone, at the U. S. Hatching Camp on the McLoud River, California. The eggs arrived in wretched condition; as they had not been iced on the journey, many of them were prematurely hatched, and the masses of eggs were generally heated.

The good eggs were placed in the hatching troughs in Mr. Kent's establishment, and hatched in a few days, the sack was absorbed in about thirty-five days, and the young fish distributed as shown in the table, from which it will be seen that one hundred and forty-four thousand (144,000) of this valuable fish were placed in the several rivers of the State.

On the 13th of October last, we received seven crates, containing each eighty thousand eggs, a liberal donation from

Professor Baird to the State of Maryland, from the same source; these were well iced on the journey and reached Baltimore in excellent condition. The hatching house in in the course of erection in Druid Hill Park, was not in a sufficiently finished state to receive them, so we placed the crates in the ice house near the "Duck Pond" in the Park, and kept them surrounded with ice for about ten days, until sufficient apparatus was put up in the hatching house to receive them. When they were put down notwithstanding the long delay, they were found in excellent condition. We were compelled to crowd the eggs very much, and move them from time to time as the work in the hatching house progressed, which caused the loss of a good many eggs, but notwithstanding the disadvantageous circumstances we have been very successful, and have a large number of fish for distribution. Our work with this large number of eggs, has proved the hatching house a thorough success, and demonstrated its great capacity.

SMELT—(*Osmerus Mordax.*)

It is the desire of your Commissioners to attempt the introduction of this savory little fish into the waters of the State. Should we succeed, they must be a valuable addition to the food resources of the numerous rivers and streams of the Eastern Shore.

In the localities where they abound, they rush up the streams in countless numbers in the spring, and are taken in seines, and although averaging but five or six inches, they are much sought after on account of their excellent flavor. Although taken in large numbers in seines, they bite readily at the hook when baited with shrimp, and other crustaceous animals, afford excellent sport, and they are said to rise readily to the fly.

They would be an excellent exchange for the tasteless gudgeon, so much sought after by youthful anglers.

THE CARP.

Professor Baird, having decided to attempt the introduction of the European Carp, engaged the services of Mr. Randolph Hessel, an eminent Pisciculturist to proceed to Germany, procure from the ponds bordering on the Danube, and transport to the United States, the best varieties, and also arranged with your Commissioners to receive the fish brought out by Mr. Hessel, and breed them in ponds which had been prepared for the purpose in Druid Hill Park. We quote from the report of the United States Commissioner, to show his estimation of the importance of their introduction. "Sufficient attention has not been paid in the United States to the introduction of the European Carp as a food fish, and yet it is quite safe to say that there is no other species that promises so great a return in limited waters. It has the preeminent advantage over such fish as the black bass, trout, grayling, etc., that it is a vegetable feeder, and although not disdaining animal matters, can thrive very well upon aquatic vegetation alone. On this account it can be kept in tanks, small ponds, etc., and a very much larger weight obtained, without expense, than in the case of the other kinds indicated.

It is on this account that its culture has been continued for centuries. It is also a mistake to compare the flesh with that of the ordinary *Cyprinidae* of the United States, such as suckers, chubs, and the like, the flesh of the genuine Carp (*Cyprinus carpio*) being firm, flaky, and in some varieties almost equal to the European Trout."

The Honorable Rodger North says: "This is the most valuable of all kinds of fish for stocking ponds, because of its quick growth, and great increase. If the feeding and breeding of this fish were more understood and practised, the advantages resulting would be very great, and a fish pond would become as valuable an article as a garden.

"Mr. Forster mentions seeing in Prussia, two or three hundred Carps, of two and three feet in length, and one five feet long, and twenty-five pounds weight: it was supposed to be about sixty years old."

The Carp family are among the least carniverous fishes, their food being chiefly soft vegetables, or decaying organic matters, and at times worms and insects. They are easily and cheaply kept, finding their food in any pond which has been under water any length of time, and stocked with aquatic plants. Another very decided advantage they have over the salmon and herring families, is their capacity of living in warmer and more stagnant water, and in fact their capacity to live almost without water. The openings between the gills are very much greater in the above mentioned families, whereas in the Carps they are partially closed by a membrane, which, by retaining moisture, keeps the gills longer in a condition to abstract oxygen from the air, and enables them to live much longer out of water.

Unfortunately for our enterprise the weather was intensely hot in Europe during Mr. Hessel's journey to the coast through Germany, and during his passage across the Atlantic. He lost all but twenty-five, of some three hundred and seventy-five which he started with, before reaching New York, and these were in such bad condition, that two more died before they could be transferred from the tanks in which they made the journey to the milk cans provided for their transportation from New York to Baltimore. He reached the carp ponds in Druid Hill Park, with three common Carp, (Cyprinus Carpio), one of that variety which is destitute of scales, (Specularis), and is so highly prized. Twelve Tench, (Cyprinus Tinca), and seven golden Tench, (Tinca Auratus), the latter are prized highly as food, attaining rapidly a weight of twelve or fifteen pounds. They are also very ornamental, being of a rich golden colour. We regret that of this importation, only six Tench and two golden Tench survive, these are male and female, and we hope that we will receive some increase from them next spring.

Professor Baird, having sent one of Mr. Milner's assistants, Mr. Welcher, with a lot of shad eggs which were intended for the German Government, instructed him to repeat the attempt of transporting the carp, etc., to America on his return. The breeding season having arrived, the owners of ponds in Germany would not permit the fish to be disturbed, so Mr. Welcher was not able to procure a very full assortment, but transported successfully and delivered to your Commissioner in New York, fifty carp, variety *Carassius gibelio* or Prussian carp, and forty-seven Orfus (Idus Melanotus) which is a beautiful golden fish, surpassing the common gold fish in colour and form. A brilliant red colour covers the upper portion of the body, and the belly portion is white, it is much more active, lively and graceful in its movements, and attains a much greater size.

It is the intention of the United States Commissioner, to make yet another effort to get a stock of good breeding fish, of the best varieties, to add to our already valuable importations. The most beneficial results are confidently expected from the introduction into our waters of those which we now have, as soon as their increase will permit of their being distributed.

BAY OR SALT WATER FISHES.

By reference to the list, in Appendix, of fishes, which are known to be found in our waters, it will be seen that we are peculiarly rich in this class of food fishes. They, however, are not found in such abundance as formerly. Those, such as our tailor or blue fish (Pomatomus Saltatrix) and the trout (Cynosion regalis) which are attracted by the herring, alewife and small fish, will, no doubt, appear in greater numbers, as these are made more plentiful, diminish still more as these decrease. The propagation of those fishes, which come up from salt water for the purpose of spawning, will be indirectly the means of increasing those fishes which are attracted in our waters by them. We can not with the present lights of fish culture, suggest means for their direct increase by artificial propagation, but understand that important experiments are being made in the development of the ova of the sheepshead, and other salt water fishes, by the U. S. Commissioner, and we will hold ourselves in readiness to benefit by any discovery which may be made in this direction.

TERRAPIN—(*Malacoclemys Palustus*)

Although one of the well-known reptiles of Maryland, yet as a food product of our waters, we do not think it without the province of your Fish Commissioners to give the celebrated diamond-back a passing notice, as we believe that it is of the greatest importance that steps should be taken to increase the much diminished and rapidly diminishing supply of this most excellent luxury of our Bay. Nowhere on the coast are they found in such excellence as on the Chesapeake Bay, although somewhat widely distributed.

It is a source of great regret to us that we have not the means to establish a model terrapin farm, so that the feasibility of cultivating this great luxury, might be clearly demonstrated to those who might visit it, and stimulate the establishment of other enterprises throughout our bay coast. The liberality of the City of Baltimore, and her Park Commissioners, has placed it in our power to daily instruct the numerous persons who visit Druid Hill Hatching House in the process of hatching and rearing trout, another of the luxuries of the water, which are fast becoming unknown in waters in which they were once plentiful.

There are hundreds of localities admirably situated in our terrapin-producing regions, which could be made more productive, acre for acre, than the best surrounding land, by the establishment of terrapin ponds.

These ponds might be constructed by fencing off the head of one or two of the numberless inlets which occur so frequently in our lower bay, or throwing fences out into the creeks, by driving boards down some seven or eight feet into the mud, so as to prevent the possibility of the terrapin burrowing under them. The bottom of the pond should shelve off to a depth of six or eight feet deep in the creek or inlet, and the fence should enclose a portion of sand bank extending some dozen or more feet beyond high water mark in which the adult terrapin can deposit their eggs. During the winter season there should be a partition fence to prevent them from coming into shallow water, as the ice which is formed on the flood sometimes falls when the tide recedes, and crushes those which are near shore. During the summer, floats should be anchored out in deep water, on which the terrapin could enjoy the sun, and the fence should be removed, so as to allow them to reach the shore during the laying season, which is in the latter part of June or in July. In addition to the larger ponds in which the stock terrapin are kept, there should be a smaller pond which could be used as a nursery.

The female, when ready to lay her eggs, comes out of the water beyond high water mark, and excavates with her hind legs a neat hole in the sand, deposits, carefully covers, and leaves her eggs. We found nine in a nest, which we examined, at the mouth of the Patuxent last summer, but we are disposed to think that this was an unusually large number. In the ponds for artificial rearing, the sand might be placed in tanks, which could be removed at the close of the laying season to the nursery pond, from which should be carefully excluded all fish, especially minnows, as they are great enemies to the terrapin in its earliest stages.

The eggs remain in the sand some two months or so, until hatched. For some time after they are free from the shell, they show no disposition to take to the water; at this period they are very vulnerable, as they are encumbered with an umbilical sac, which presents a salient point of attack to small fishes; they should be carefully protected from these casualties and provided with soft mud in which to bury themselves during their hibernation.

Even after the umbilical sac is absorbed, there must be a great number destroyed when at large, by the larger fishes. We found a terrapin evidently of the previous summer's brood in the stomach of a catfish, taken in the Upper Bay last Spring.

There are a great many terrapin consumed each year, which could very profitably be kept for two or three years in ponds, as above described, and fed upon small fish during the summer, when the alewife, et cetera, can be taken in great abundance in the terrapin regions.

DESTRUCTION OF SMALL FISH BY SEINES.

We find that the destruction of small fish is immense at every haul of the seines, and yet it is exceedingly difficult to devise means to avoid it, for if the meshes used were larger, the herring would escape, and in landing the seines as is customary in our waters, it is impossible to separate the fish and save the small ones alive to be returned to the waters. There are, therefore, numbers of small fish termed "offal," which would be valuable for food if unmolested for another year, accumulated in heaps on the shores to make their decaying presence felt by nauseous odors, or are hauled out on the

land, an imperfect fertilizer. The only means which we can suggest by which these fish could be saved is the construction and use of the fish ponds, such as are operated on the Detroit River, and thus described by Professor Milner, in the Report of the United States Commissioner to whom we are indebted for the accompanying plate.

THE "PONDS" OF DETROIT RIVER.

"These fisheries, known as ponds, are among the most extensive establishments of the lake. Large numbers of white-fish are kept alive in them, from the fall of the year, to late in the winter, when they are taken out, and sold in the market at good prices. The best ponds are situated at Islands in the middle of the River, where there is an ample circulation of water, keeping the fish in vigorous, healthy condition for months.

"The pond is merely an inclosure in the river, made by driving piles close together, and afterward sheathing the inside with planks, leaving joints of three quarters of an inch in width, to allow the free circulation of water through the pond. At one end of the pond a gate is put in, hinged at the bottom of the river to a mudsill, and the upper portion, floating at an angle of about 45°, projects a foot or more above the surface, closing the entrance to the pond. By pushing the gate beneath the surface, with a pole, it is opened to the extent of one, two, three or more feet, according to the depth the top of the gate is pushed down. The accompanying plate represents one of the best arranged and conducted fisheries on Detroit River. The buildings for the men, the net house, and the store house, with the windlass sheds, are all in view. It will be seen that the fishing is carried on by sweeping a seine in front of the pond, that is drawn in by horse power. When the brails come on shore the men haul in the seine until the bag is reached, when the leads are thrown over the top of the gate, which is then pushed down, leaving an open space at the surface, of two feet, though which the fish are emptied into the pond, without being touched by the hand or taken above water.

"At this fishery, the seines in use are about one hundred rods long. A gang of thirty men are employed from September to the middle of November, working in two relays, night and day, and averaging about one sweep of the seine every hour. In each pond, from twenty-five to forty thousand white-fishes, and a number of other species, are penned up every season."

By making the spaces between the piles sufficiently large to allow the small fish to escape, but small enough to retain the marketable ones, many would be left to increase in size, which are now wantonly destroyed. The use of such ponds would be of great economy to fisheries, irrespective of the prospective benefits which might be derived, as they might, by keeping the fish alive, save the use of ice, and instead of having boats running every day to market, whether full or not, they could have certain days to send the produce of several days catch to market, and neighbouring fisheries could enter into co-operative transportation arrangements.

We deem the adopting of the pond arrangement, of such advantage to our people, by saving the "offal," to become edible fish, that we recommend that the State should offer inducements for their construction as hereinafter suggested.

The floats or batteries, such as are operated on the flats in the neighborhood of Havre de Grace, might be readily arranged, so that the seines could be landed as in the ponds described, and the smaller fish allowed to escape. The float of Messrs. Sadler & Gilbert, who operate a seine of 800 fathoms and employ about 40 hands, is simply a large raft 60x80 ft., of sufficient buoyancy to be moved to any desirable point on the flats, where it is secured into position by piles, which pass through wells in the raft. On the float, are quarters, stabling, a storehouse, salting sheds and windlasses. Each of three sides of the float is provided with an apron 45 feet wide, which is held in position by heavy chains, and can be raised or lowered at will. This apron provides an inclined plane, up which the seine is hauled, and landed in the same manner in which shore seines are. The selection of the side on which the landing is made, is determined by the direction of the current, wind, etc. The fourth side is used as a wharf.

With a view of ascertaining the condition of our waters, their adaptability for the introduction of foreign species, and their capacity of furnishing food, etc., for them, we have examined carefully the rivers of the State, commencing in the extreme North West, among the tributaries of the Youghiogeny, and have completed our examination, as far South and East as the Chester. We have made collections of the fishes found in them as even the smallest minnows, and all animal life found in the waters, are of importance as furnishing food for the larger food fishes. We have deposited these collections in the museum of the Maryland Academy of Sciences—the Society having furnished us with the alcohol. In the appendix will be found a descriptive list of the species which are known to inhabit the waters of the Chesapeake Bay and its tributaries, carefully prepared by, and under the superintendence of Prof. P. R. Uhler—the able President of the Academy. We hope that in our future collections, we will be able to bring together a complete representation of the fishes of our waters, and believe that many species will be added to our list.

FISH-WAYS.

In order that we might better make the examination required in section 2nd of chapter 150, Laws 1874, we selected a time when the Potomac River was very low, to make a survey of the Great Falls.

President Arthur P. Gorman, who has ever manifested the greatest interest in the work of the Commission, kindly placed his packet at our disposal, and furnished us with the necessary transportation up the canal. We invited the Commissioners of Fisheries of Virginia to make the survey with us, as both States are equally interested in having an efficient fish-way constructed over this barrier, to the ascent of fishes from the tide water to the upper portions of the States, drained by the Potomac and its tributaries. Colonel A. Mosely representing his Commission accordingly met us at Georgetown,

D. C., on the 12th of July, and we proceeded up the canal in President Gorman's boat, accompanied by his courteous paymaster, Mr. Gambrill. By taking the route by water, we were able to examine the Little Falls, and other parts on the river. Major Richard Randolph, Engineer of Baltimore and Ohio R. Road, had kindly promised his valuable aid gratuiously, and had secured for us the services of two of his assistants, Messrs. Gordon and Jones, who, under his able guidance, ran the necessary lines, and took the levels. We are greatly indebted to Major Randolph for his experienced advice, and his assistance in making this important preliminary survey, and beg to submit his report:

T. B. Ferguson,

Dear Sir:—I make for you this memorandum of the result of our observations last summer at the Great Falls of the Potomac, where I had the pleasure of witnessing your dexterous and graceful handling of the fly-rod, while your obedient oarsman quickly or steadily propelled your light boat among the thousand islets of the fishing grounds; mounting and descending the numerous rapids with almost the same facility as that of the game which you were pursuing, and presenting to me, as I stood admiring in the distance, a picture which has left a deeper impression upon my memory, than did the luxurious repast afforded us that night by your numerous captures. I saw enough to convince me of the great importance of the enterprise you have in charge, of seeing that the injunction of "crescite et multiplicamini," inscribed upon the arms of Maryland, and which seems to be particularly directed to the attention of the man with the fish, is carried out. And I hope that you will make it appear that the great barrier of the falls which prevents our finest fish from ascending higher, can, at a moderate cost, be circumvented.

The broad bed of the Potomac, above the falls, with its islands and innumerable projecting points, is formed by a horizontal ledge of granite rock, which, at the falls, is cleft across the entire bed by a deep fissure, while lesser fissures at right angles to this present several channels, for the escape of the waters to the bottom of the chasm in as many series of tumbles.

The main volume flows through the second fissure from the Virginia shore, falling fifty feet in about eight hundred feet of distance, the last tumble being nearly a perpendicular fall of about fifteen feet, separated from this by a wall of rock, a smaller volume rushes between it and the precipice forming the Virginia shore. Both of these torrents are received in a deep basin and proceed from thence, and following the transverse cleft to the Maryland side, where it deflects nearly a right angle, escape by a longitudinal cleft of about the same width, flowing at a moderate velocity.

Another of these fissures leading into the transverse chasm marks out the Maryland shore, and formerly conducted another volume of water, and was called the Little River. But since the erection of the dam of the Washington Water Works from an island in the middle of the river to the Maryland shore, no water flows in this channel except what is let out of the waste weir. The space intervening between the currents next to the Virginia shore and Little River, is called Falls Island. During floods the waters find their way over nearly all of its rugged surface, and are, for the most part, precipitated into the chasm below, through another of these parallel fissures near the middle of the lower end of the island. Each of these fissures present at their entrance into the transverse chasm nearly the same declivity.

The waters, at ordinary stages, after being precipitated by any of these channels from the ledge above, all find an exit by the same channel, and which flows in the same line as that of Little River produced. In its higher stages there are two other out-lets, one following the transverse cleft to its end on the left, where deflecting a right angle to the right, it follows the base of the wall built to sustain the Chesapeake and Ohio Canal. The other runs in a straight line between two rock walls, with a width of about forty feet, and begins at the transverse fissure about five hundred feet east of where Little River enters it. Both reach the main channel about eight hundred feet below this point.

The first place we examined, with a view of providing a fish-way, was the location of the old Potomac Canal on the Virginia side. But this being upon ground twenty feet higher than the top of falls, and emptying into the river at a point ten feet lower than their foot gave thirty feet of extra elevation to be overcome. And the distance where the numerous locks were clustered, was so short as to preclude the idea of making available any of the old work.

Our next consideration was the erection of wooden fish-ways, leading from the basin at the foot of the falls where the shad congregate in their baffled efforts to ascend higher, and provided with the usual zig-zag or spiral compartments to require the water to traverse a sufficient distance to reduce its velocity enough to be overcome by the fish. But when we saw on every side, the clean and bare walls of rock, and the rugged ledges where nothing had been allowed to remain, except some immense boulders or some temporary deposits of sand in protected hollows, it was easy to realize the power of the Potomac, when its swollen floods plunged over and through them, and the grinding effect of the glaciers which are so often driven before the accumulated water. We could see no place where such unsubstantial structures could be fixed without being brushed away like straws. It seemed that the only practicable and secure passage-way for shad was, that which could be afforded by cutting out of the rock a channel having a rate of descent sufficiently moderate to enable the fish to ascend.

To ascertain the best mode and probable cost of accomplishing this, the engineers who accompanied us traced two lines with the transit, and found the elevations of the points with the level. Both of these commenced at the dam of the Water Works: one followed the edge of Falls Island to the shad basin and beyond, the other followed the course of Little River to the point where the main volume deflecting to the right, leaves the great transverse fissure. These lines with their profiles are laid down upon the map, which has been made to illustrate your report.

The basin where the shad are arrested, is so close to the ledge from which the waters are precipitated, that any practicable grade could not be cut out from that point without an inordinate expense; as a grade ascending at the rate of four to the hundred following the lowest part of the channel, would require a rock cutting fifteen hundred feet long, with a depth of twenty feet in the middle: which would be greatly increased by any lateral deviation in consequence of the higher ledges on each side. Besides the whole of the blasting and removal of the rock would have to be carried on in the face of the torrent, unless the dam of the Water Works should be extended to the Virginia shore, and all the water be allowed to escape by way of Little River.

From what I have read in the report of the United States Fish Commission, which you were kind enough to send me, I am inclined to believe, that if a considerable volume of water were made to issue obliquely into the main channel, at a point lower down the river, and at a velocity, although not great enough to prevent the ascent of shad, yet, much exceeding that of the larger quantity in the main channel: that most of the fish would be attracted by the superior current, and be induced to follow the artificial water-way, and if a barrier were thrown across the main channel, just above the confluence, then all of them would take that course.

I think that such a fish-way can be constructed at a very moderate expense, by following the route of Little River and, what is apparently, a continuation of the same cleft in the ledge below the great transverse cleft.

I have estimated the cost of such a way, supposing a grade descending at the rate of four in one hundred to be adopted. Although such a descent would produce a velocity far too rapid if the channel had straight and smooth sides, and bottom with much depth of flow; yet, if the water had to struggle through and over ragged projections of rock, or fragments too heavy to be moved, it would be so impeded that it would not obtain a general velocity that could not be easily overcome by the fish; while everywhere they would find either a resting place or a solid point against which to react in their endeavors to stem or mount the current. I have frequently observed in long stretches of mountain streams descending nearly uniformly at, at least as great an inclination as this, that the Speckled Trout had no difficulty in mounting, and that I could easily keep up with floating particles, without exceeding a trot on a pathless ground.

An excavation beginning and ending within a distance of seven hundred feet, and of a depth in the middle of about ten feet, containing less than five thousand cubic yards of rock, will establish the grade of four in one hundred as a maximum in the bed of Little River, and give it a minimum width of thirty feet. This will coincide with the present bottom of the transverse fissure to be crossed obliquely, and which would then only require the rock from the excavation to be placed on each side to retain the water there, and to conduct it into the cleft in the ledge below, whose bottom with a width of about forty feet descends from there gradually to the main channel, at a point eight hundred feet further down where it is about one hundred feet wide, and flows with a gentle velocity. One dollar per cubic yard would be a full price for this excavation, and five thousand dollars would be an ample allowance for all the expenses in making the fish-way complete, making a total estimate of ten thousand dollars.

At periods of very high water, of course, the effect of the artificial channel would be greatly diminished; but I imagine that although the fish may be started in their migration by the Spring freshets penetrating far down into the salt water; yet, that by the time they have reached the Great Falls, the river will have subsided to its ordinary stage, when a gill-net stretched across just above the fish-way may serve the double purpose of making a remunerative catch, and of diverting the rest into the ascendable channel. The supplying of the proposed new course with the requisite volume of water, depends upon the Government's completing the dam of the Water Works, and providing a sufficient waste-way near the Maryland end.

If, however, that period may be deemed too remote, an additional expense of about four thousand dollars will connect the channel of Little River with the main body of water, by means of an excavation across the upper end of Falls Island, which would make the total cost of this route fourteen thousand dollars.

If you should adapt Jas. D. Brewer's patent fish-way to the main channel, located as you have suggested, on the west side of Falls Island and alongside of the falls, it will be necessary to excavate about fifteen thousand five hundred cubic yards of rock, in order to provide an incline plane upon which to build the zig-zag walls and for the channels for ingress and egress with the proper rate of inclination. Putting this at one dollar per yard, will amount to fifteen thousand and five hundred dollars. This price may not be sufficient, from the fact, that it will be difficult to make these excavations without being interfered with by the water.

From the sketch of the fish-way which you have shown me I estimate that it will require about two hundred and twenty-five cubic yards of cut stone, some of which would have to be fastened down with iron pins or bolts. This would cost about ten dollars per yard amounting to two thousand two hundred and fifty dollars, and make up a total cost of seventeen thousand seven hundred and fifty dollars.

I hope what I have written, although containing no suggestion of value to the subject which you have in hand, will prove to be a correct description of the locality and of the difficulties to be overcome in enabling the migratory fishes to ascend the Potomac beyond the Great Falls.

Yours, &c,,

RD. RANDOLPH.

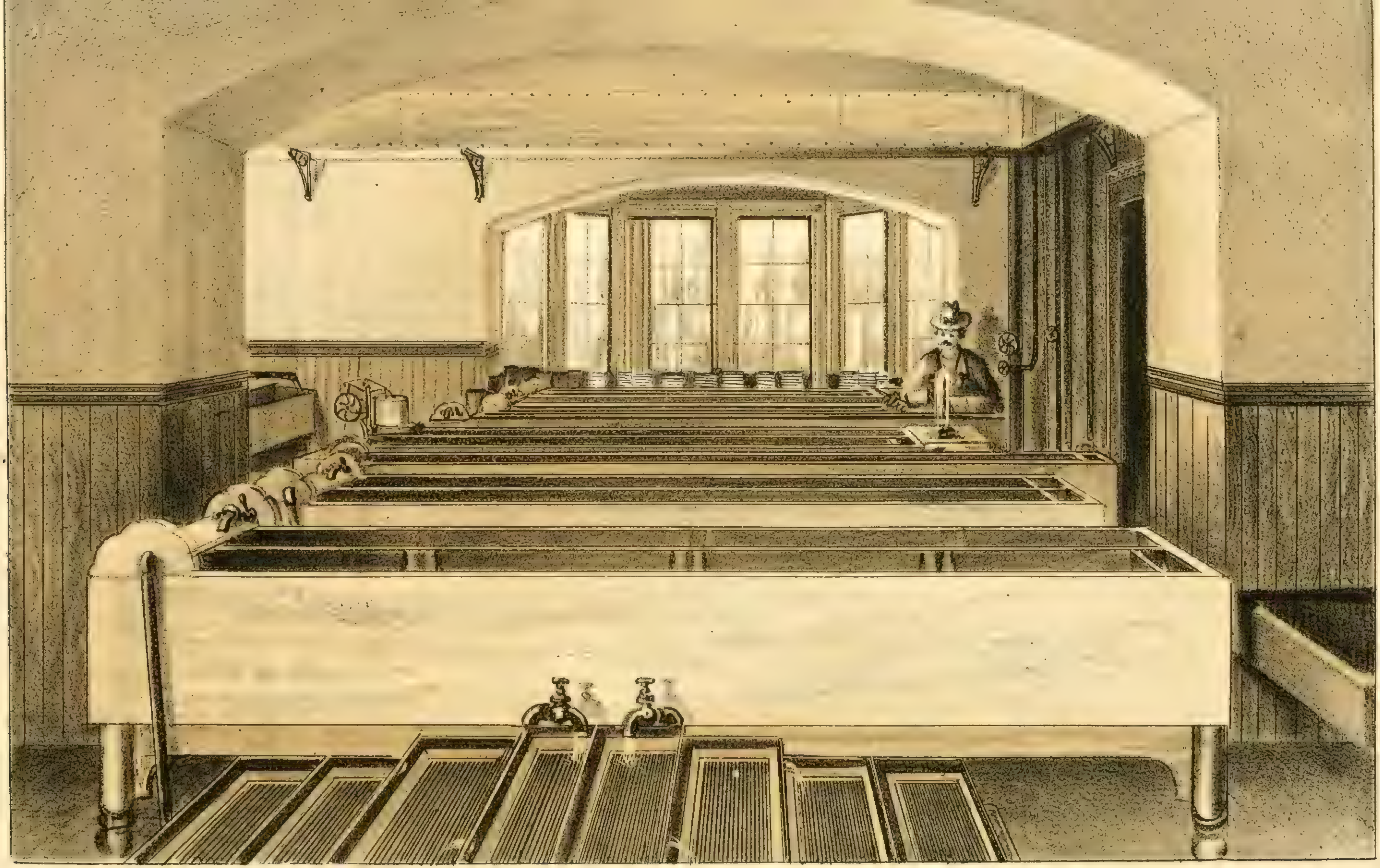
———o———

The accompanying map will show the profiles of lines run, and localities referred to in Major Randolph's report, as well as the location and plan of a fish-way proposed by Commissioner T. B. Ferguson, which provides for the construction of a channel, by blasting the rocks, with a grade of about three feet to the hundred, and then by means of devices for breaking the current, ascend in some two hundred feet about sixteen feet, and then by following the low places in the rocks, ascend some twenty-eight feet in eight hundred. This would necessitate the erection of a wall at a point where the water makes into the rock on the Maryland side opposite to the main falls. We have traced in the plan, simply as an illustration, a fish-way patented by Jas. D. Brewer, as it is one of the latest models, but do not intend in any manner to be understood as recommending its adoption, as we prefer to be governed, in deciding on a plan, by the results of the experiments which will be tested in the coming Spring before anything can be done towards the erection of a fish-way at this point. We would suggest, that, as four States and the District of Columbia are interested in the results to be obtained, and as the work will have to be done on land owned by the United States Government, and as the success of any plan is very dependent on the erection and management of the Government Water-Works at this point, that some action be taken by your Excellency, or the General Assembly, to secure at least co-operation on the part of the General Government.

We find that it is entirely feasible to construct fish-ways over the dams throughout the State, and recommend that some statutory provision be made to ensure the enjoyment of the ancient and common law right which the people living on our rivers have to the free passage of the fish to their spawning beds. They have been entirely cut off from the Gunpowder by the several dams on that stream. We are informed by Mr. Henry Carroll, that before the dams were erected, that the shad and rock ascended in numbers as far up as his estate and were taken by the people on horseback by spearing them. Since they have been cut off from access to their spawning beds in the upper river, they have greatly diminished and almost disappeared from the lower river.

HATCHING HOUSE.

Section 3 of Act establishing the Commission of Fisheries, authorizes the Commissioners to "obtain the necessary ova, and construct and erect suitable houses and devices for hatching the same, and protecting the small fish, until fit to be distributed." But after a careful investigation into the cost of the site, and the erection of a hatching house, we found that we would not have the means to procure eggs, hatch them, and distribute the young fish—if we made the necessary outlay for a hatching house. We, therefore, arranged with Mr. Alexander Kent, to have the eggs which we might receive from the U. S. Commissioner, hatched in his establishment at Green Spring. Accordingly we placed in his charge the three hundred and seventy-five thousand eggs of



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INTERIOR OF DRUID HILL HATCHING HOUSE.

the California Salmon received in October, 1874, and the eighty thousand of the Maine Salmon received March 9th, of the same year.

We found that if we had to pay the usual charge of one dollar and fifty cents ($1.50) per thousand for hatching Salmon eggs, we would not be able to operate as largely as desirable, even though we received the eggs free of all save express charges, from the U. S. Commissioner.

As we deemed it of the greatest importance that we should for some years to come introduce the California Salmon in as large numbers as possible, we made application to the U. S. Commissioner for a million of eggs from his establishment on the McLoud River, when he should distribute them in the Fall of 1875. To provide for their reception and care, we carefully examined the springs and their surroundings in Druid Hill Park, and after consultation with the Park Commissioners, addressed the communication which follows—

To the Honorable Mayor and Council,
of the City of Baltimore.

The undersigned, a Commissioner of Fisheries of the State of Maryland, being desirous to see established, in the vicinity of Baltimore, a hatching house, and ponds for the artificial propagation of fish, has consulted the Public Park Commissioners with the view of obtaining for the purpose the facilities which the Druid Hill Park affords, with its numerous springs, well adapted localities, etc., and believes that did the means at the disposal of the Commissioners admit, they would gladly see within the Park limits, an establishment not merely valuable for increasing the fish food resources of the State at large, but which would be an object of peculiar interest to all visitors to the Park. The arrangements of this establishment might be such as to contribute materially to the beauty of the Park, but without the means for any other than the most necessary expenditures to keep the Park in order, the Park Commissioners are unable to devote any portion of them to the purpose suggested. It is understood, however, that they cordially agree to the application now made to your Honorable Body for any appropriation for the purpose specified, which can be accomplished for the sum of five thousand dollars, a contribution to the beauty and interest of the Park which, it is earnestly hoped, your Honorable Body will find no difficulty in granting.

T. B. Ferguson, Commissioner.

In response to an invitation from Mr. John S. Bullock, Chairman of the "Committee of Ways and Means" to whom this letter was referred, Mr. Ferguson appeared before, and explained to the Committee the scope of the establishment such as contemplated, though comparatively small, such are the improvements in the apparatus used in fish culture, that millions of eggs could be hatched during the winter, and distributed throughout the State.

Should the Water Board decide on the introduction of those fishes which would be likely to keep the water in the lakes and reservoirs pure, that by means of the hatching house, the supply could be so kept up that the lakes might be thrown open to anglers under proper restriction.

Having a breeding establishment in so central and accessible a locality, the citizens of Baltimore, as well as those from all parts of the State, would be educated to the importance, and thoroughly understand the subject of fish culture around which there has been some mystery thrown.

That the student of natural history might have an excellent opportunity of studying the habits, and observing the gradual development of the several kinds of fish ab ovo.

That it was contemplated to use the most approved kinds of apparatus, and to construct the ponds in the most perfect manner, so that those wishing to add fish culture to the other recreations and industries of their farms and country seats, would have before them a model in the establishment in the Park. Such is the topography of the country surrounding Baltimore, that almost every farm or villa has its spring or springs. Although there are few localities which offer facilities for fish culture as a business, yet almost every good spring can be made to support a thousand or so fish, which if consumed by the farmer, saves him just so much meat, and if sent to market adds just so much to the food supply from the country.

That the operations could be so conducted that visitors could see the various stages of the development of the eggs and the subsequent growth of the fish, and that our schools would have an opportunity of having illustrated to their classes in natural history, the discoveries on this important branch. That it would be a very important step towards supplying a long felt need in this country, of opportunities for students to study the embryology of the oviparous inhabitants of the water. In the pond connected with the hatching house would be deposited from time to time the several varieties of fish which were being introduced into the waters of the State, so that at this central point, the public would have an opportunity to see and become familiar with them.

He stated to the committee that should they see fit to make the appropriation asked, and the house was erected, and ponds constructed, the Commission of Fisheries would gladly take charge of them, and relieve the City and Park Commission of all expense of operating them. After the correspondence which follows a favorable report was made by the Committee, and the resolution making the appropriation which is copied below, was passed.

First Branch City Council,
Baltimore, March 24th, 1875.

To the Board of Park Commission.

Gentlemen:

A proposition has been submitted to the Mayor and City Council of Baltimore, by Major T. B. Ferguson, one of the Commissioners of Fisheries of the State of Maryland, in relation to the establishment of a Fish Hatchery in Druid Hill Park, and asking an appropriation of $5,000 to defray the expenses of constructing a house and appurtenances necessary for the same. The subject is now pending before the Committee of Ways and Means, who have instructed me to lay the matter before your Hon. Board, and ask an expression of your views in relation thereto.

With great respect,
Allen E. Forester,
Committee Clerk.

OFFICE OF THE COMMISSION OF PUBLIC PARKS,
Baltimore, April 3rd, 1875.

The following proceedings were adopted in relation to the above:

A communication was received from the Clerk of the Committee of the Ways and Means of the First Branch of the Councils, submitting a proposition from the Fish Commission, looking to the construction of the necessary buildings and ponds for the hatching and production of fish in Druid Hill Park, which meets the approbation of the Park Commission, not in connection with the raising of fish with which they have no peculiar concern, but with a view of ornamentation in the Park, and increasing its attractions to the Public, when on motion it was *Resolved*, that the Commission will assent to the request of the Fish Commission, provided, that the place and location of all buildings and other construction in the Park, be first submitted to, and approved by the Commission.

(283)

A Resolution in relation to the establishment of a fish hatching house and ponds in Druid Hill Park.

Resolved, by the Mayor and City Council of Baltimore, that the Park Commissioners be, and they are hereby requested to erect a hatching house, and construct ponds for breeding, rearing and exhibiting fish in Druid Hill Park, and that the sum of five thousand dollars, or so much thereof as may be necessary, be appropriated for the purpose, the same to be provided for in the levy of 1875.

SIGNED:—OTIS KEILHOLTZ,
Prest. First Branch.
HENRY SEIM,
Pres'd't. Second Branch.

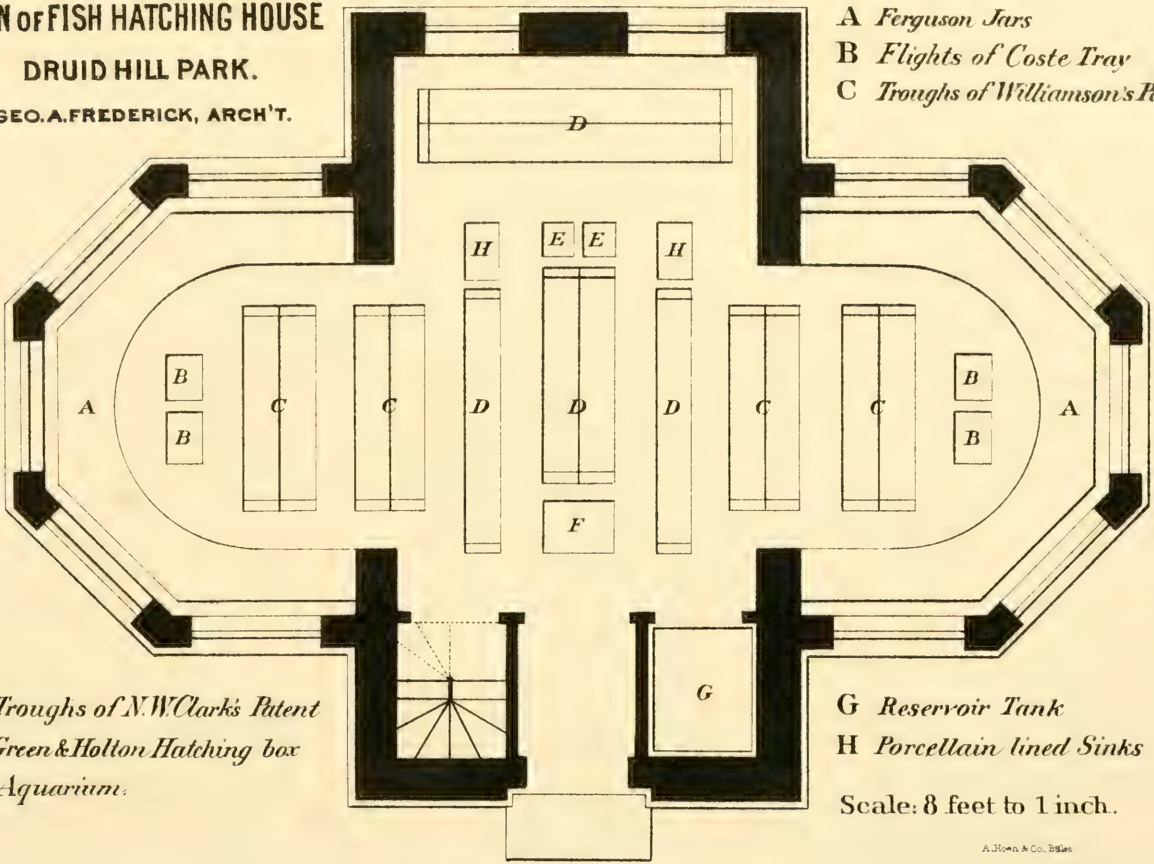
Approved May 11th, 1875.
JOSHUA VANSANT, Mayor.

The Park Commissioners had kindly instructed their Architect Mr. Geo. A. Frederick, to made a design for a building which would meet the requirements of the Fish Commission for fish culture: the estimate of $5,000 was based on the original design, which contemplated a wooden building, but the Park Commissioners decided that a stone structure

PLAN OF FISH HATCHING HOUSE

DRUID HILL PARK.

GEO. A. FREDERICK, ARCH'T.



A *Ferguson Jars*
B *Flights of Coste Tray*
C *Troughs of Williamson's Patent*
D *Troughs of N. W. Clark's Patent*
E *Green & Holton Hatching box*
F *Aquarium.*
G *Reservoir Tank*
H *Porcellain lined Sinks*

Scale: 8 feet to 1 inch.

A. Hoen & Co. Balto

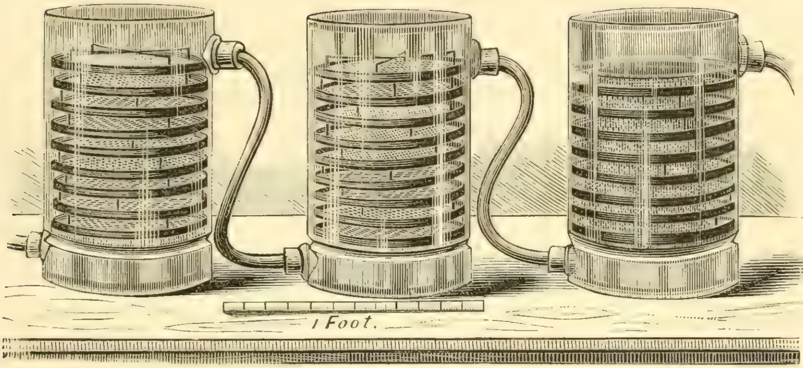
would be more in unison with the surroundings of the locality selected, and with the heavy stone bridge near by, they therefore caused to be erected the beautiful stone building which adds so much to the beauty and attractions of the locality about Garrett's Bridge, although it necessitated a considerable additional expenditure which they generously provided for out of their fund for Park improvements. In accordance with the understanding with the Park Commissioners that we should have the use of the ponds and hatching house free of charge, we have placed the imported Carp in the ponds, and have hatched over six hundred thousand California Salmon in the hatching house, and have now, January 1st, 1876, forty-five thousand Salmon-Trout eggs in the hatching jars. The details of the construction of the ponds and surroundings, have been admirably designed and carried out by Mr. August Faul, the Park Engineer, and the ponds are models of completeness.

The great success of the hatching house, its capacity for hatching large numbers of eggs, the completeness of its arrangement, the ease and comfort with which the routine duties can be performed by the attendants, merits for it some description of the interior.

The building is of blue stone with white granite trimmings; the centre 18½ x 33 ft., is two stories high, and on either side are octagonal wings 14½ x 20 ft., whose sides are almost entirely of glass. The greatest amount of light and air is admitted through these, and two large windows in the gable end of the main buildings, the inner door of the vestibules is also of glass. The windows are all furnished with dark green water-proof curtains, to exclude the sun and light when desirable. The water is supplied from a strong spring on the side of the hill near by, and is piped into the filtering tank which is just below the ceiling of the hatching room, which occupies the first floor of the building. The supply pipe is so arranged with valves that the water can be conducted into the ponds below the house without entering the filtering tank should it be desirable. The water after passing through a series of flannel filters is discharged from the filtering tank into the reservoir tank "G." of the capacity of about twelve hundred gallons. From this tank the water is piped under the floor, which is a Schillenger pavement, to the several hatching troughs, and to the tables "A," in the octagonal extensions. These pipes are admirably arranged with stop-cocks, so that any portion of the apparatus can be operated without regard to the rest of the building.

In addition to the supply from the spring there are pipes by means of which an unlimited amount of water can be thrown into the filtering tank or ponds from the high service reservoir which is on the hill to the west of the hatching house. The water from the reservoir being influenced by the temperature of the atmosphere, and that from the spring being invariable, by mixing in different proportions, we can either raise or diminish the temperature of the water used, at will. The pipes which conduct the water to tables "A," on which the Ferguson Jars are operated, are furnished with ⅜-of-an-inch spickets, over which rubber tubes are slipped, for the purpose of introducing water into the jars. These jars are of glass of the form shown in the annexed cut, which was made from a photograph taken when there were in the jar, on the right, between six and seven thousand eggs of the Salmon Trout. In the jars will be seen the wire trays on which the eggs are placed, the handle of each tray supports the tray next above.

When the young fish are free from the egg, they drop into the bottom of the jar, and can be easily transferred to the nursery tanks by placing the jar into the tank; and by removing the cork through which the rubber pipe passes, the fish can swim out, or if too inactive, a current can be created by lifting the jar. Several jars can be connected as in the cut, or operated singly if water is abundant. Each jar is provided with a tin cover, a larger cylinder than the jar, which excludes the light, and the tables are furnished with seventy jars each, making the total capacity of the two tables, nearly one and a-half millions of brook Trout eggs. Through the whole extent of the apartment are troughs arranged in pairs, which are provided with movable partitions, and can be used as hatching or rearing troughs; immediately below each pair is another pair which can also be similarly used. The accompanying cut shows the manner in which the water is introduced and taken away. They are admirably arranged



Ferguson Hatching Jars.

to secure a perfect circulation and change of water which is constantly flowing through them. The water having passed through the upper troughs furnishes the lower pair, dropping down through a space of about 18 or 20 inches, it is completely broken and aerated.

Those marked "C" are arranged so as to cause the water to enter at the bottom of the trays in each division; flowing up through them, and over the top of the partition, is conducted into the next division from below. This is the form of hatching box designed by John Williamson, Secretary of the California Acclimatizing Society. The troughs marked "D" are so arranged that the water takes just the opposite course, entering at the top of the trays, it flows down through them. This device is patented by N. W. Clark, of Michigan, who has kindly permitted their use by us, without charge. At "B" there are two flights of Coste trays, after the model of those used at Humingen and elsewhere in Europe. "E" are hatching boxes, as patented by Green & Holton, and so successfully used in the hatching house of the New York Commission. The right to use them was kindly accorded us by Seth Green, Esq., the assignee.

In aquarium "F" which is supplied with running water, we intend exhibiting rare fishes, from time to time. The porcelain lined sinks "H," furnished with the same water which is used in the troughs, are of great convenience. All the water, save that from the sinks, after being used in the hatching house, is conducted into the ponds below the building. The coste trays and the troughs next to them can be removed at any time without interfering with the flow of water, and can be replaced by stoves or aquaria as desired. It is scarcely probable that it will be found necessary to use stoves as the spring water entering the building at a temperature of 53° Fahrenheit, and being exposed in the closely built stone building, the temperature is kept much above freezing. The two rooms above, in the second story, are occupied respectively as office and sleeping apartment for keeper. The moisture is cut off from the second story, by a layer of slate in the walls.

We are indebted to the City of Baltimore and the Park Commissioners for this most complete, comfortable, and perfect establishment, in which many millions of fish can be hatched and distributed each winter, at no great expense, if we are provided with means to procure the eggs.

CONCLUSION.

By reference to tables recording hatching operations and distribution of Shad, Salmon, &c., it will be seen, that we have hatched and turned loose into our waters four million three hundred and forty thousand young Shad, in addition to the four million nine hundred and seventy-five thousand five hundred and fifty hatched and liberated in the Potomac, under the auspices of Prof. Spencer F. Baird, at a cost to the United States of over three thousand dollars ($3,000), that we successfully planted one hundred and forty-four thousand healthy, vigorous, California Salmon, eighty thousand Maine Salmon, two thousand Salmon Trout, and transferred five hundred Black Bass, most of them adults, from the Potomac River to other waters of the State. We have in addition put out, within the past two weeks, ninety-one thousand five hundred California Salmon, and have in the Druid Hill Hatching House over four hundred thousand of two months old fish still for distribution, besides about three thousand of a year old. There are in the hatching jars, forty-five thousand eggs of the Salmon Trout, which are hatching every day.

We find the same decrease in our valuable food fishes, which has been felt in other parts of the country, and which has been arrested in some States by artificial propagation, and by judicious protection.

That the decrease is attributable to:

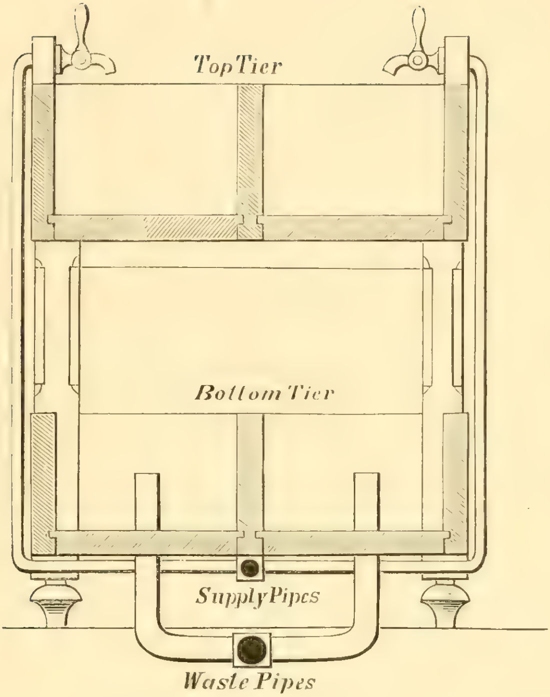
1st. Excessive fishing.

2nd. The cutting off of the migratory fishes from their spawning beds.

3rd. The disturbing of the breeding fish on their spawning beds.

4th. The destruction of spawn, by washings from cultivated fields, and natural enemies.

5th. The destruction of young fish, by improper means and modes of capture.



Section of Hatching Trough, $\frac{3}{4}$ Scale.

The remedies are:

1st. Artificial propagation to supply the excessive drain caused by increased population, and improved means of capture.

2nd. By prohibiting all fishing with nets, seines, or fixed apparatus for thirty-six hours in each week, during the migrations of anadromus fishes, so as to give a sufficient number of breeding fish an opportunity of reaching their spawning grounds, (this is universally believed to be the most important step towards the preservation of our best food fishes.)

3rd. By protecting the fish on their spawning beds; that is, by prohibiting their capture as their spawning seasons approach (the habits of each species must determine the period during which it should be protected.)

4th. By the apparatus of fish culture to protect the eggs and young fish from the causes of loss.

5th. By regulating the size of the meshes of nets and seines, and by prohibiting the erection or use of "fish-traps" or "fish-baskets," (we cannot too strongly urge the entire abolition of "fish-traps.")

We would recommend that a small tax be levied on seines, nets and fixed apparatus used to capture fish, and that the tax be in proportion to their capacity of destroying fish.—Those from whom this tax will be collected, will be the most immediately effected by the results of artificial propagation, and should be ready to furnish some of the means to carry on the hatching operations.

We would recommend, in order to induce the construction of "ponds," such as here-in-before described, that all seines landed in such "ponds," be exempt from taxation for a certain period.

We would also recommend, in order to better regulate the fishing, that all nets, seines, and fixed apparatuses, be licensed, and that "Fish Wardens" be provided, whose duties will be to see the laws enforced in the river districts, and that provisions be made to ensure the observance of the laws in the bay and navigable rivers.

Several instances have been reported to us, of parties coming into our waters from other States, hauling large seines and taking off large quantities of fish, in some instances landing their seines on shores without permission of the proprietors, and in defiance of them. Such depredations and lawlessness should be stopped.

We believe that with proper equipments, and an annual appropriation of ten thousand dollars, the best food fishes can be propagated in sufficient numbers, to meet the increasing diminution, and restore our abandoned fisheries.

We beg leave here to express our grateful acknowledgments to all those, who have from time to time aided us in stocking our rivers, and in other work connected with the Commission, without whose aid we could not have accomplished so much with the means at our disposal. In addition to those whom we have already mentioned, we beg to express our especial thanks to Vice-Presidents John King and Wm. Keyser, of the Baltimore and Ohio Railroad for free transportation. To Thos. R. Sharpe, Master of Transportation and Mr. Oliver Hoblitzel, of the same road, for many acts of courtesy, by which we were enabled to move live fish with rapidity on their fast trains. To President, J. M. Hood, of the Western Maryland Railroad, and Mr. Geo. C. Wilkins, Superintendent of the Northern Central Railroad, for free transportation, and for general orders, which insured the assistance of their agents. We are also indebted to Mr. Samuel M. Shoemaker, the Resident Manager of Adams' Express Company, for an order instructing all agents of his Company to transport freight of the Commission at half price. To Ex-Vice-President, DuBarry, for free transportation during his administration, on the Baltimore and Potomac Railroad. And to Mr. Augustus Albert, President of the Chester River Steamboat Company, for full use of their line of Steamers.

Respectfully submitted,
T. B. FERGUSON,
PHILIP W. DOWNES,
Commissioners of Fisheries.

January 1st, 1876.

RECORD

OF

Shad Hatching OPERATIONS.

RECORD

Of Shad Hatching operations conducted at Bristol, Maryland, on the Patuxent River, from April 27th, 1875, to May 30th, 1875, on account of the State of Maryland, by Oren M. Chase.

Line No.	Date.	Temperature.				Wind.	Fish Taken.	Ripe Fish.	Eggs Obtained.	Fish Turned Loose.	REMARKS.
		Air.		Surface Water		Direct'n.					
		7 A.M.	6 P.M.	7 A.M.	6 P.M.						
...	Ap. 27	56	60	48	52	N. West.	200	1	20,000		Water very muddy.
...	28	56	60	48	50	North.	110				Freshet.
...	29	58	60	49	52	South.	60				Blowing a gale.
...	30	60	62	52	56	North.	90				
...	May 1	58	58	54	54	N. East.					
...	2	56	52	50	48	N. West.					Blowing very hard.
...	3	48	46	48	64	N. West.					
...	4	48	46	52	56	North.					High Wind.
...	5	50	56	52	58	S. West.					
...	6	56	56	54	60	West.					
...	7	50	62	52	59	East.	160	2	60,000		
...	8	52	60	58	60	S. East.	280				
...	9	58	78	59	65	North.					
...	10	74	60	65	65	N. West.		31	465,000		Heavy gale.
...	11	60	74	63	68	S. West.	160	9	180,000		
...	12	67	70	63	68	South.	260	13	215,000		Blowing hard.

...	May 13	50	58	64	63	S. East.	127	10	225,000		
...	14	60	71	64	68	S. East.	118	19	365,000	40,000	
...	15	75	70	66	65	N. West.	110	10	170,000		
...	16	54	63	63	65	North.					
...	17	62	65	63	65	N. West.	102	9	240,000	320,000	
...	18	61	58	62	64	West.	90	7	160,000	140,000	
...	19	52	60	60	63	North.				160,000	Heavy wind and raining.
...	20	64	76	61	64	Chang'g	241	12	280,000	175,000	
...	21	71	80	63	68	South.	90			250,000	
...	22	73	80	68	71	S. West.				140,000	
...	23	80	83	71	75	South.				190,000	
...	24	70	71	75	74	South.	72	10	230,000	140,000	Blowing and raining.
...	25	68	82	74	78	East.	86	19	380,000		Raining hard.
...	26	73	80	75	78	N. West.				240,000	Fishing stopped to-day.
...	27	78	78	76	78	N. East.					
...	28	76	79	74	79	South.					
...	29	70	78	74	78	S. West.				210,000	
...	30	66	78	72	77	North.				350,000	
						Total				2,355,000	All turned loose in Patux't Riv.

RECORD

Of Shad Hatching operations conducted at Coppage's Landing on the Chester River, Md., from May 6th, 1875, *to June* 14*th*, 1875, *on account of the State of Maryland, by Alex. Kent.*

Line No.	Date.	Temperature.				Wind.	Fish Taken.	Ripe Fish.	Eggs Obtained.	Fish Turned Loose.	REMARKS.
		Air.		Surface Water.		Direct'n.					
				2 to 3 P.M.							
...	May 6	...	...	60	...	....	150	5	3,000	....	Fish only partially ripe.
...	7	...	...	64	...	....	300	4	20,000	....	" " " "
...	8	...	...	62	...	....	150	1	4,000	....	" " " "
...	9	...	...	64	...	....	700	....	....	....	....
...	10	...	...	65	...	....	310	1	20,000	....	....
...	11	...	...	66	...	....	165	....	....	....	....
...	12	...	...	67	...	....	....	....	....	....	....
...	13	...	...	67	...	....	39	....	....	....	....
...	14	...	...	67	...	....	27	....	....	....	....
...	15	...	...	63	...	....	106	2	10,000	....	Fish only partially ripe.
...	16	...	...	63	...	....	97	....	....	....	....
...	17	...	...	65	...	....	....	....	....	....	....
...	18	...	...	66	...	....	....	....	....	25,000	....
...	19	...	...	67	...	....	189	5	60,000	5,000	Fish only partially ripe.
...	20	...	...	71	...	....	144	3	20,000	5,000	" " " "

Record of Shad Hatching at Coppage's Landing—Continued.

Line No.	Date.	Temperrture.			Wind.	Fish Taken.	Ripe Fish.	Eggs Obtained.	Fish Turned Loose.	REMARKS.
		Air.	Surface Water.		Direct'n.					
			7 A.M.	3 P.M.						
...	May 21	... ...	72	80	...	225	5	100,000	...	Fish only partially ripe.
...	22	... ...	75	82	...	160	4	100,000	...	" " " "
...	23	... ...	76	83	...	265	...	...	...	...
...	24	... ...	76	83	...	158	4	80,000	150,000	...
...	25	... ...	76	78	...	126	6	150,000	...	...
...	26	... ...	75	77	...	117	18	250,000	60,000	...
...	27	... ...	78	80	...	87	10	200,000	70,000	...
...	28	... ...	75	78	...	36	8	100,000	140,000	Fish only partially ripe.
...	29	... ...	76	79	...	46	10	All died	125,000	...
...	30	... ...	74	73	...	137	10	250,000	150,000	...
...	31	... ...	73	73	...	83	...	125,000	60,000	...
...	June 1	... ...	72	74	...	23	12	225,000	125,000	...
...	2	... ...	72	73	...	63	5	40,000	75,000	...
...	3	... ...	70	71	...	14	...	...	...	...
...	4	... ...	70	72	...	47	18	250,000	150,000	...
...	5	... ...	74	77	...	...	...	...	...	40,000 sent to Choptank.
...	6	... ...	76	79	...	...	...	...	...	...
...	7	... ...	77	80	...	36	3	150,000	...	...

Record of Shad Hatching at Coppage's Landing—Continued.

Line No.	Date.	Temperature.		Wind.	Fish Taken.	Ripe Fish.	Eggs Obtained.	Fish Turned Loose.	REMARKS.
		Air.	Surface Water.	Direct'n.					
...	8	... ...	76 78	....	60	10	225,000	125,000	60,000 sent to Elkton.
...	9	... ...	72 76	....	....	9	200,000	....	....
...	10	... ...	73 78	....	....	8	150,000	....	....
...	11	... ...	76 79	....	....	6	No milt.	75,000	30,000 to Gunpouder.
...	12	... ...	77 80	....	....	....	....	200,000	....
...	13	... ...	73 74	....	....	....	....	180,000	60,000 to Potmac.
...	14	... ...	73 74	....	....	....	....	75,000	....
							Totals	1,795,000	190,000 aggregating 1,985,000.

A.

RECORD of Shad Hatching operations conducted at Freestone, Va., on the Potomac River, from May 15th, 1875, to May 25th, 1875, on account of U. S. Commission, by Jonathan Mason.

Line No.	Date.	Temperature. Air.			Temperature. Surface Water.			Wind. Direct'n.	Fish Taken.	Ripe Fish Females.	Eggs Obtained.	Fish Turned loose in River.	REMARKS.
		6.AM.	M.	6PM.	6AM.	M.	6PM.						
1	May 15	58	80	63	56	60	61	V.	445	10	175,000	....	From 4 fish taken many eggs all dead
2	16	50	60	58	55	59	63	N.	170	3	75,000	....	....
3	17	52	60	57	56	61	64	N. W.	371	16	408,000	....	....
4	18	52	63	55	58	62	64	S.	311	12	257,000	....	....
5	19	48	72	68	58	64	64	S. W.	329	12	390,000	....	....
6	20	52	80	81	59	65	68	S.	304	1	25,000	....	....
7	21	56	78	65	62	72	76	S. E.	173	6	125,000	103,500	4 ripe fish not recorded, eggs all dead
8	22	62	78	68	68	72	75	S.	....	....	....	215,000	Seine stopped.
9	23	63	84	82	69	79	78	S. E.	....	....	....	472,000	....
10	24	70	80	69	72	78	75	S. E.	....	....	....	266,250	....
11	25	66	81	....	71	75	....	S. E.	....	....	....	100,000	Total. 1,156,750

A.

RECORD of Shad Hatching operations conducted at Moxley's Point, on the Potomac River, from May 26th, 1875, to June 7th, 1875, on account of U. S. Commission, by Jonathan Mason.

Line No.	Date.	Temperature.						Wind.	Fish Taken	Ripe Fish	Eggs Obtained	Fish Turned Loose.	REMARKS.
		Air.			Surface Water.			Direct'n.		Females.			
		6AM.	M.	6 PM.	6 AM.	M.	6PM.						
1	May 26	66	82	80	71	75	72	N.	87	8	200,000	....	
2	27	70	78	72	72	77	79	E.	112	2	50,000	....	From one fish, all eggs dead, eggs looking bad when taken.
3	28	67	80	71	69	78	77	E.	270	24	565,000	....	1 fish, eggs all dead, 5 fish with poor eggs.
4	29	73	84	75	70	78	78	S. to N.	126	12	290,000	....	First fish hatched.
5	30	62	74	74	70	78	74	N.	134	13	275,000	160,000	
6	31	67	80	76	70	79	78	V.	113	6	125,000	25,000	One net cut out.
7	June 1	70	81	75	72	80	81	S. E.	130	6	120,000	50,000	Wind very high, causing loss of eggs.
8	2	71	71	71	73	71	74	S.	103	6	130,000	232,500	
9	3	63	71	71	70	71	72	S. E.	....	....	....	220,000	
10	4	63	78	73	70	81	79	V.	....	....	....	210,000	Shipped 30,000 to Washington and turned into Potomac at that point.
11	5	69	82	74	71	80	80	S.	....	....	....	105,000	
12	6	71	80	82	73	82	84	W.	....	....	....	70,000	
13	7	72	....	....	74	...	...	S.	....	....	....	110,000	Total turned into river 1,182,500.

A.

RECORD of Shad Hatching operations conducted at Jackson City, on the Potomac River, from May 18th, 1875, to June 4th, 1875, on account of U. S. Commission, by H. W. Welsher.

Line No.	Date.	Temperature.				Wind.	Fish Taken.	Ripe Fish.		Eggs Obtained.	REMARKS.
		Air.		Surface Water.		Direct'n.		Males.	Fem'ls		
		6 A.M.	6 PM	6 A.M.	6 P.M.						
1	May 18	...	...	60	61	W.	80				
2	19	...	...	61	62	W.	58				
3	20	...	...	63	64	N. W.	40	2	1	12,000	
4	21	67	66	67	66	S.E. & S.	36	1	1	15,000	
5	22	72	72	66	70	W.	11	1	3	60,000	
6	23	76	80	77	76		30	1	1	15,000	
7	24	67	71	70	73	S. E.	25	2	4	70,000	
8	25	68	74	71	75	E.	28	1	2	40,000	
9	26	68	79	72	76	N. E.	6	0	0	6,000	
10	27	72	66	78	75	E.	20	2	3	70,000	Part washed out by gale. Fish partly developed.
11	28	68	64	72	74	S.	25	3	7	150,000	
12	29	60	72	72	76	N. W.	24	4	9	160,000	
13	30	63	74	66	76	N.	52	1	4	50,000	
14	31	59	71	69	76	N.	46	2	6	150,000	

A.—*Continued.*

RECORD of Shad Hatching operations conducted at Jackson City, Va., on the Potomac River, from May 18th, 1875, to June 4th, 1875, on account of U. S. Commission, by H. W. Welsher.

Line No.	Date.	Temperature.				Wind.	Fish Taken.	Ripe Fish.		Eggs Obtained.	Eggs Lost.	REMARKS.
		Air.		Surface Water.		Direct'n.		Males.	Fem'ls.			
		6AM	6PM	6AM	6PM							
15	June 1	67	70	72	75	S. S. E.	33	2	4	100,000	....	
16	2	62	64	70	72	S.	22	2	3	75,000	....	Fishing Stopped.
17	3	62	68	69	70	S. E.	50	1	6	125,000	119,209.	Fish turned into river, 1,072,-
18	4	68	78	71	78	E.	37	3	5	100,000	....	800.

NOTE.—Total number turned into Potomac, 4,975,550.

A.

RECORD of Shad Hatching operations conducted at Ferry Landing, on the Potomac River, from May 21st, 1875, to May 29th, 1875, on account of U. S. Commission, by H. W. Welsher.

Line No.	Date.	Temperature.			Wind.	Fish Taken.	Ripe Fish.		Eggs Obtained.	REMARKS.
		Air.	Surface Water.		Direct'n.		Males.	Fem'ls		
			6AM	6PM						
1	May 1	....	68	69	S. W.	860	....	2	60,000	Seine hauled three times every twen-
2	2	....	70	70	S.	801	....	3	90,000	ty-four hours.
3	3	....	70	71	W.	569	....	5	130,000	....
4	4	....	72	72	S. W.	384	....	6	155,000	....
5	5	....	72	72	N. E.	383	....	10	260,000	....
6	6	....	72	73	S. E.	568	....	9	220,000	1,263,500 turned loose at ferry.
7	7	....	72	74	N. E.	695	....	8	200,000	300,000 taken to Jackson City, and
8	8	....	75	76	S. E.	514	....	14	300,000	turned loose at that point. Total—
9	9	....	76	...	S.	....	....	2	55,000	1,563,500.

LIST

Of Fisheries on the Potomac River.

No.	Name of Fishery.	By whom Owned.	By whom Fished.	REMARKS.
		Maryland.		
1	White Point.			
2	Maryland Point.	Moore & Smith.	Price Green.	
3	Budd's Ferry.		Cunningham.	
4	Stump Neck.		Cunningham.	
5	Rum Point.			
6	Chapman's Point.	Pearson Chapman.	J. S. Chapman.	
7	Pomonkey Point.		S. H. Barron.	
8	Gutt Landing.		W. M. Elliott.	
9	Greenway.	Mrs. Brant.	Moore, Smith & Co.	
10	Bryan Point.		Conrad Faunce.	
11	Moxley Point.		Jerry Skidmore.	
12	Meddow Bars.			
13	Tent Landing.		Capt. Jas. Guy.	
14	Sandy Bar.			
15	Berry's Landing.			
		D. C.		
	Skidmore's Island.			
	Stick Landing.			

LIST

Of Fisheries on the Potomac River, Continued.

No.	Name of Fishery.	By whom Owned.	By whom Fished.	REMARKS.
1	Caywoods.		Joseph Cogwood.	
2	Mathias Point.			
3	Windmill Point.		Conrad Faunce.	
4	Tumps.			
5	Gum.		Jerry Dobbles.	
6	Arkendale.		Joseph Beasley.	
7	Clifton.		Withers, Waller & Co.	
8	Freestone Point.	J. W. Fairfax.	Jacob Faunce.	
9	Deep Hole.		McKewen & Ticer.	
10	Sandy Point.		Henderson & Kelly.	
11	Ceale's Point.		Tucker & Hall.	
12	Barn Landing.		Jno. Heisler.	
13	Tick Landing.		A. J. Heisler.	
14	Terry Landing.	Wm. Ruitz.		
15	Dangerfields.			
16	Jackson's City.		Gibson Heirs.	

JOURNAL

KEPT AT

SHAD HATCHING CAMP

ON

CHESTER RIVER,

April 27th to June 14th, 1875.

A JOURNAL

Kept by Alexander Kent, from April 27th, to June 14th, 1875, showing operations conducted at Coppage's Landing, Chester River, under directions of T. B. Ferguson, Commissioner of Fisheries, Maryland:

April 27th.—Left Baltimore on Steamer Chester, for Chester River; stormy weather prevented further progress than Chestertown.

April 28th.—Storm more violent, could not proceed.

April 29th.—Clear and pleasant, proceeded up river, verified information previously received by calling at shore continually:—John Primrose, owner of first fishery, rents to colored men for $150.00 per annum. Thomas Primrose, the second, lets to F. Nichols. John Harris, the third, fishes it himself. The fourth is owned and fished by Edward Slaughter, worth $125.00 per annum. The fifth by Samuel Chairs owned and fished, worth $175.00 per annum. The sixth owned and fished by Robert Bostwick, worth $250.00 per annum. The seventh is fished by G. H. Fennimore, owned in Delaware, worth $75.00 per annum. The eighth owned by Sheppard, fished by John Carson. The three next in order are Gray's fishery, owned by Mrs. Fry, one fished by Samuel Ashley, colored, and one by Chester Larman, also colored. The following three shores owned by Mr. Pickup, and fished by Ralph, then one owned by Matleline, and fished by Ralph. The rents vary greatly, running as high as $400.00. We found Coppage's Landing, about three miles above Crumpton, a favorable locality for camp, water was fresh, and many shad caught, nearly ripe.

April 30th.—Catch light, no ripe fish.

May 1st.—Catch very light, no ripe fish.

May 3rd.—Cold and windy, caught two hundred shad, none ripe.

May 4th.—Catch lighter, got a thousand or more eggs from partially ripe fish.

May 5th.—Caught only fifty shad, none ripe. From Thursday to Wednesday, temperature of water ranged from 52° to 57°.

May 6th.—Examined one hundred and fifty shad, found five partially ripe; obtained only three or four thousand eggs; temperature of water at 2 o'clock P. M., 60°.

May 7th.—Examined three hundred shad, none fully ripe, from which few eggs were obtained; good many from one; total, 20,000; temperature of water at 3 P. M., 64° on surface.

May 8th.—Examined twenty-five before day-light, none ripe; afternoon hauls yielded one hundred and fifty, none ripe; morning cool, day cloudy, temperature of water at noon 62°; sent for more hatching boxes; in the evening, took about forty thousand spawn; from Saturday to Monday, seven hundred shad caught, all unripe, split and salted them; in some of them roe was beginning to separate, most of them compact, and in a few beginning to run near the vent.

May 10th.—Caught about two hundred and sixty-five in the morning; in the evening, one hundred; total number spawn, 20,000 from one ripe shad.

May 11th.—Caught one hundred and sixty-five, none ripe.

May 12th.—Caught thirty-four, none ripe.

May 13th.—Caught sixty-five, none ripe.

May 14th.—Caught twenty-seven, none ripe.

May 15th.—Caught one hundred and thirty-six, two partially ripe, obtained ten thousand eggs.

May 17th.—Caught ninety-seven, none ripe.

May 18th.—Caught one hundred and nineteen, none ripe

May 19th.—Caught one hundred and eighty-nine, two ripe; three partially ripe; took about sixty thousand eggs.

May 20th.—Caught one hundred and forty-four, three ripe; took sixty thousand eggs, two of the fish were stripped an hour after they were dead, and milt taken from dead males caught three hours before.

May 21st.—Morning catch one hundred and twenty-nine, large portion females, unripe; evening catch ninety-six, five ripe, 100,000 eggs; eggs taken on 20th from dead fish, and impregnated with milt from dead males, look very well; especially lot carried for twenty minutes in search of milt, they were more fully matured than others, and nearly all good.

May 22nd.—Morning catch ninety, none ripe; eggs looking well; fish quite active in those of 19th; morning tide unusually low at 2½ o'clock A. M.; found five boxes of eggs taken last evening entirely out of water; temperature of air and water about the same; eggs being moist were uninjured; evening, catch seventy-four ripe females, 100,000 eggs.

May 23rd.—One seine hauled two hundred and sixty-five, caught none ripe; saw large number split Monday; roe firm generally.

May 24th.—Morning catch one hundred, none ripe; evening catch fifty-eight, four ripe, 80,000 eggs; eggs of Saturday doing well; up river seine caught none; alewives made their appearance at "the Rocks," from this fact, some fishermen predict immediate decline of shad.

May 25th.—Morning catch only twenty-five; evening catch one hundred and one, six ripe; yielded one hundred and fifty thousand eggs. Lot No. 9 taken Saturday, nearly all hatched, lost about twenty-five per cent. Lot No. 10, taken Monday, doing well.

May 26th.—Morning catch none; Lot No. 11 taken Tuesday, looking, except one box, very well; evening, catch one hundred and sixteen, took spawn from 18; many eggs had a dull look, even when ripe; in some fish all were dead; this we find generally the case when a fish bears marks of a gill-net; in some cases when no injury is perceptible, we find all the spawn dead. We think that whipping the river, thus terrifying the shad, injures the eggs; the eggs taken are estimated at 250,000, (Lot 12.)

May 27th.—Morning haul yielded only one; evening haul eighty-seven. Stripped ten females and took 200,000 eggs. In several fish, eggs dull color; many of which failed to impregnate, though treated with greatest care.

May 28th.—Caught thirty-six, mostly females, stripped eight, but more than half the eggs failed to impregnate, obtained one from a giller, just as he took it from the net; stripped it very carefully, and milted immediately, using very little water, stirring gently until the the milt was thoroughly diffused through the mass. The milt flowed freely, and was taken from a fish not quite dead. The eggs were transparent but slightly pale. Not more than forty per cent. of these, however, showed impregnation. As this failure to impregnate has been experienced only since the hot weather, I am disposed to attribute it partly, at least, to the high temperature of the water in the shallow parts of the river through which the Shad are obliged to pass. We have recorded a temperature of 82°, and have no doubt that farther down the river, on the large flats it has been frequently higher.

May 29th.—Morning catch 22, some ripe males, no ripe females; preserved vial of milt for night catch: at night caught 24; stripped ten females, found only dead spawn, every egg failing to impregnate.

May 30th.—Sunday morning from one seine haul eighty-nine, saw them cut, their roe was firm in many, apparently weeks from maturity, in others nearly ripe and dead. Evening haul ten ripe females in good condition, and milt sufficient to impregnate: weather cooler all day, nearly all impregnated: the Shad were not worried nor delayed during their run by gill nets, which fact probably explains their good condition.

May 31st.—Morning haul seventy-four: six ripe females: not a living egg: bottled what milt we could and preserved it in spring water until returning to camp, then hung it in well until evening. While waiting to make haul in the evening, procured ripe females from a giller, also two males from which obtained very little milt, used this on one lot, and bottled milt on the other; a good percentage in both lots impregnated. The defect of those that failed, may have been in eggs or milt, or both. The experiment, however, proved the possibility of preserving milt of Shad, or any other fish, alive. In both cases eggs were taken from dead fish, though caught within the hour. In one case the milt was taken from a dead fish caught at the same time as the female used; in the other it was taken several hours before, from a live fish, and kept in a bottle until wanted, we had other females, and no milt, so took the eggs dry, and kept them in an open pan until milt was obtained, in one hour and a half the two pans thus treated, did better than either of those referred to above; a large percentage impregnating. I deem the preservation of eggs much less difficult than that of milt. In both a moderately low temperature is favorable, if not essential. No ripe females from our own haul. Eggs from gillers 125,000.

June 1st.—Morning haul took twenty-three; no ripe females and but few ripe males. Bottled a small amount of milt. Our experience had led us to hope for little from our midnight haul, so we determined to try the gillers again; we found the Shad running freely and several ripe ones just caught. Mr. Wroten obtained one male which he used for one pan; the quantity was so small that very few eggs impregnated. Not finding any more males, I stripped the rest of the females, and preserved the spawn in dry pans, hoping to obtain milters from our regular haul. In order to avoid injury to the spawn from a sudden change of temperature, the air being very much colder than the water, I placed the pans which were to receive it in other pans partially filled with water. We were obliged to wait from 9.30 P. M. to 12.30 for milt. One haul yielded only forty-three fish. The majority females but none ripe; the milt flowed less freely than was desirable, but we had to use such as we could get. The results were favorable, a large percentage of the eggs developing. I omitted to state that the milt taken through the day turned out badly, probably owing to the fact that in taking it some blood and excrement dropped into the bottle. It was tested on a hundred or more good eggs. The estimate of number of eggs taken is 225,000.

June 2nd.—Noon haul caught sixty-three; three-fourths females; all unripe except one; eggs all dead; took some milt and bottled it.

June 3rd.—Caught fourteen, none ripe.

June 4th.—Caught forty-seven; none ripe; got eleven ripe females, and six ripe males from gillers, from which obtained 250,000 eggs, nearly all of which came up finely: used bottled milt kept nearly two days, on one lot.

June 5th.—Took no ripe fish.

June 6th.—Took no ripe fish; forty thousand young Shad were sent to Choptank safely.

June 7th.—No morning haul: evening haul caught thirty-six: three ripe; took 150.000 eggs.

June 8th.—Morning catch fifty-two, none ripe; evening catch only eight, eggs from three, milt from two; got seven spawners and four milters from gillers: took 225,000 eggs—these were all manipulated under disadvantages, but with entire success. They were obtained and managed as follows: First, we obtained from a giller's catch of six, only one ripe milter, no spawners, wiped a pan dry and took the milt, and then went in search of spawn. Found a giller with one ripe fish partially spawned, got fifteen thousand eggs, stripped them into the milt and then watered sparingly, all came up; we next got from the seine one spawner and one very poor milter, from which we only got two or three drops, as the eggs were already watered it was necessary to make the best we could of this very small quantity of milt, accordingly, it was thoroughly stirred through the mass of eggs. Fearing to trust this, however, we went in search of more; in about fifteen minutes we obtained two more milters, each of which furnished a few drops, adding this we soon had the pleasure of seeing the eggs come up finely. We next took dry, the spawn of five, and proceeded a mile or more up the river in search of milt—obtained from the seine two more spawners and one milter, taking a very small quantity of the milt, not more than fifteen drops dry upon the mass of spawn already in the pan, we then added the eggs from the remaining spawners, after which enough water was added to enable us to diffuse the milt through the eggs, they were stirred with unusual force so that the milt should be as generally distributed as possible, I expected that this violence would kill a great many of the eggs, and I had little hope of securing the impregnation of more than one in five. The result, however, was the finest pan of spawn we have had this season.

considering the number of eggs contained—not less than one hundred and eighty thousand.

June 9th.—The eggs taken last night, not one died in five hundred. Mr. Hamlen returned from Elk River, and reported the successful shipment of thirty thousand young Shad, with which he started yesterday, he took them in two fifteen gallon cans across the country by wagon, started from camp at 5.30 o'clock, A. M., and reached the river at Ricbald's Wharf at 1 P. M.; temperature at starting 74°. It fell gradually during the journey and stood at 70° on reaching the river. Temperature of the river at the time of depositing them was 71°. The water was neither changed nor added to during the trip, he reports that the fish were in excellent condition when placed in the stream; 30,000 were sent yesterday for Nanticoke, but were sent by mistake to Philadelphia where they remained all night, reaching Elkton at 11 A. M. to-day. Mr. Downes reports that they stood remarkably well, only a few died. Procured 200,000 eggs from nine spawners, from the gillers chiefly—all becoming fecund.

June 10th.—Eggs of 9th looking well, those of 8th showing larger mortality than expected, those of the 7th doing well since the 2nd day—a few hatching this evening; took twenty-five ounces of eggs the evening, six thousand to the ounce, total 150,000, but got only one male Shad, from which pressed a very few drops of milt; less than one-half the eggs were impregnated.

June 11th.—Eggs of ninth not looking so well, those of 8th no worse, those of 7th rapidly hatching, those of last night as good as expected; took about ten ounces of eggs only two drops of milt from a dead fish, all died.

June 12th.—Shipped all fish taken to Cockeysville, those of 8th hatching rapidly and in large numbers; loss of eggs much lighter than we feared, not more than ten per cent.

June 13th.—Eggs of 8th all hatched, those of 9th nearly all out, these also hatched ninety per cent.

June 14th.—Turned loose seventy-five thousand, and shipped sixty thousand to Piedmont in charge of Mr. Hamlen; broke up camp, and reported to Mr. Ferguson in Baltimore.

RECORD

Of distribution of California Salmon made from November 25th, 1874, to December 15th, 1874, by ————, direction aryland Commissioners of Fisheries.

No. of Line.	Date of Transfer.	OBTAINED FROM—	Place whence Taken.	NUMBER OF FISH. Originally Taken.	NUMBER OF FISH. Actually Planted.	INTRODUCTION OF FISH. Place.	INTRODUCTION OF FISH. Stream.	INTRODUCTION OF FISH. Tributary of	RANSFER HARGE OF	REMARKS.
1	Nov. 25th	U. S. Commissioner.	Green Spring. Trout Ponds.	6,000	6,000	Tank Station, W. M. R. R.	North Patapsco	Patapsco.	B. Ferguson,	
2	" "	" " "	" "	1,500	1,500	Wakefield, W. M. R. R.	Pipe Creek.	Monocacy	" "	
3	" "	" " "	" "	1,000	1,000	Union Bridge.	" "	"	" "	
4	" "	" " "	" "	1,500	1,500	Slabtown.	Owens Creek.	"	" "	
5	" "	" " "	" "	3,000	3,000	Hagerstown.	Antietam.	Potomac.	" "	
6	" 30th	" " "	" "	10,000	10,000	Parkton, Freeland, Middletown and Gores Meedow.	Gunpowder.	Gunpowder.	" "	
7	Dec. 1st	" " "	" "	6,000	6,000	Eastern Shore	Rivers.		W. Downes,	
8	" 2nd	" " "	" "	10,000	10 000	Hagerstown.	Conococheague,	Potomac.	" "	
9	" "	" " "	" "	6,000	6,000	Mechanicstown.	Owens Creek.	Monocacy.	n. Hamlen,	
10	" "	" " "	" "	5,000	5,000	Above Tameny.	Evitts Creek.	Potomac.	W. Downes,	
11	" "	" " "	" "	5,000	5,000	Near Jenning Run.	Wills Creek.	"	" "	
12	" 3rd	" " "	" "	15,000	15,000	Frankville.	Savage.	"	B. Ferguson,	
13	" 5th	" " "	" "	4,000	4,000	Monrovia.	Bush Creek.	Monocacy.	j. F. Sheriff,	
14	" "	" " "	" "	6,000	6,000	Hood's Mill.	Patapsco.	Patapsco.	n. Hamlen,	
15	" "	" " "	" "	10,000	10,000	Liberty Grove.	Octoraro Creek.	Susquehanna.	W. Downes,	
16	" 9th	" " "	" "	8,000	8,000	In Howard County.	3 Branches of	Patuxent.	B. Ferguson,	
17	" "	" " "	" "	15,000	15,000	Romney, Va.	South Fork.	Potomac.	j. F. Sheriff,	
18	" "	" " "	" "	15,000	15,000	Ft. Pendleton.	North Fork.	Potomac.	x. Kent,	
19	" 15th	" " "	" "	10,000	10,000	Near Source of	Patuxent.	Patuxent.	n. Hamlen.	
20	" "	" " "	" "	6,000	6,000	Near Penn Line.	Deer Creek.	Susquehanna.	j. F Sheriff,	Total distributed 144,000

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LIST OF FISH

OF

MARYLAND.

Explanations and Abreviations.

ACAD. COLL. signifies that specimens are in the Maryland Academy of Sciences.

S. I. Specimens are in the Smithsonion Institution, at Washington.

FINS.—D. Dorsal, *i. e.* on the back; sometimes 2 in number.

P. Pectoral; attached behind the gill-covers.

V. Ventral: attached to the lower side in front.

A. Anal; attached to the belly near the vent.

C. Caudal; the tail fin.

LIST

OF THE

FISH OF MARYLAND,

BY

P. R. UHLER AND OTTO LUGGER.

A list of the fishes of our State to be complete should embrace the names of all the kinds which exist in all the streams, basins and bays of the region, and of the ocean along its shores. But as no systematic survey has yet been made of its various hydrographic basins, such a list cannot at present be composed. Much, however, has been done toward recognizing the prominent fishes of this territory, and the results of this knowledge are given in the following pages.

It will be seen that the greater number of species most esteemed for food in the eastern and central portions of the State belong to the Perch, Shad and Salmon groups. The first comprises in itself about one-half of all the kinds of fish most commonly offered for sale in the markets of Baltimore and the smaller cities. While these supply a source of revenue to all the tide-water districts of the State, a few forms such as the Shad and Herring, are now, or have been, the great source of wealth to the fishermen and owners of fisheries on the lower Potomac, Susquehanna, rivers of the northern part of the Eastern Shore and principal streams of the Western Shore. Until within a very few years, Shad and Herring appeared in considerable numbers in the Bush, Gunpowder, Back, Magothy, Patapsco and Patuxent rivers, but recently they have failed to appear in them: or, as in the N. W. Branch of the Patapsco, only a few now enter to run towards the fresher waters.

While in the oyster districts, the Drum, Sheepshead, Porgy, Bay Trout, and Blue-fish or Tailor, form the principal fisheries, in the briny waters of the lower parts of the Bay and its estuaries, the Pig-fish and Spot are most highly esteemed and sought for.

Sinepuxent Bay and its connecting inlets are well supplied with Tailors, Bay Trout, Spots, Drum, Sheepshead, Yellow-tail, (called White Perch there,) Black Perch, and Black Will. In the Monocacy, upper Potomac and Susquehanna above tide-water, the Fall fish and a variety of smaller kinds of the same group form no inconsiderable part of the food of the districts. All the tributaries of the upper Potomac are now stocked, more or less considerably, with the Black Bass, which is eagerly fished for by the people of the adjacent counties.

Nor are the various species of Pike overlooked in the sluggish streams lying near to tide-water: but, one of which, the *Esox reticulatus*, is sent in winter in large numbers to Baltimore, and from this place is distributed by rail and wagon to the farmers of Carroll, Frederick and Baltimore counties.

The present list embraces every species of fish, certainly known by one or other member of our Section of Ichthyology, to have been caught in Maryland waters, excepting a few only of which the names have not yet been ascertained. Every opportunity has been embraced to obtain full series of the fish of this State, and the results of this activity may be seen in the large collection of specimens now on exhibition in the Museum of the Maryland Academy of Sciences, and where they are daily open to the inspection of the public, free of charge for admission.

To the kind attentions of Professors Baird and Gill we are indebted for advice and aid, in the recognition of the latest system of nomenclature in the larger groups, and in the names of particular fish.

I.—ORTHAGORISCIDÆ.

MOLA Cuv.

M. ROTUNDA.

The Ocean Sun-Fish, or Short Head.

Broad oval, blunt behind, compressed, no scales, nor lateral line. Head not distinct from the trunk, back dark grey, abdomen white, the sides soiled white with silvery reflections: a broad, almost black band, commences at the origin of the dorsal fin, is continued in front of the caudal and anal fins to the vent.

Fin-rays—D. 13, P. 12—13; A. 13—15; C. 8—9.

The caudal fin is connected both with the dorsal fin and the anal.

M. rotunda, Gill.

Orthagoriscus mola, DeKay, New York Fauna, fishes, p. 331, pl. 59, fig. 193.

Occurs in the ocean on the coast of Worcester county.

II.—DIODONTIDÆ.

DIODON, Cuv.

D. HYSTRIX.

The Sea Porcupine.

Form oval, dilated like a cushion, but flattened on the back, beset with moderately long, white spines, which slant backwards when the creature is not irritated; color pale brownish, beneath whitish, the sides and back with round, brown dots, and the fins with smaller, closer dots; length extending to two feet, but always smaller in Chesapeake Bay.

Fin-rays:—D. 13; P. 25; A. 14; C. 8½.

D. hystrix, Bloch, Poissons, vol. 4, pl. 126; Naturalists' Library, vol. 35, pl. 16.

Has been caught a few times with hook and line on the coast of Worcester county, and in the Chesapeake off the southern extremity of St. Mary's county.

Being covered with stout and sharp spines: it is an object of great disgust to the unlucky fisherman who chances to find one attached to the end of his line. They swell themselves into a round ball, beset in every direction with long spines, and with the spaces between the spines too small to admit the fingers of the human hand.

ACAD. COLL.

CHYLOMYCTERUS Bibron.

C. GEOMETRICUS.

The Spiny Box Fish.

Body trunk-shaped, front of head abruptly descending, the whole surface, except chin and tail, covered with sharp, recurved, triangular, compressed spines, each with a three pointed base, the upper ones larger than the lower, those over the eyes quite prominent. (This species possesses the property of puffing itself up into a globular ball, and can float in this state on the surface.) Bright sea-green above, with longitudinal, olive-brown, irregular stripes on the back, and upper part of the sides, and oblique stripes below the eyes. It has eight large olive-brown spots of irregular form. Abdomen whitish.

Fin-rays:—D. 13; P. 24; A. 12; C. 9.

C. geometricus, (Guenther VIII. p. 310.)

Diodon geometricus, Bl. Schn. p. 513, fig. 96.

— *maculato-striatus*, Mitchill, Trans. Lit. & Phil. Soc. New York, I. p. 470, pl. 6, fig. 3; DeKay, New York, Fauna, Fish. p. 323, pl. 56, fig. 185.

— *rivulatus*, Cuv. Mem. Mus. IV. p. 129, pl. 6.

— *nigrolineatus*, Ayres. Journ. Bost. Soc. Nat. Hist. IV. 1842 p. 68.

— *fuliginosus*, DeKay, l. c. p. 324, pl. 55, fig. 181.

— *verrucosus*, DeKay, l. c. p. 325, pl. 56, fig. 184.

Not uncommon along the coast, entering the bays; only met with in summer, never in cold weather: sometimes common in Worcester county.

ACAD. COLL. S. I.

TRICHODIODON Bleek.

T. PILOSUS.

The Hairy Box Fish.

Form oval, a little flattened above, inflated. The spines are hair-like, one-eighth of an inch long in an example 1½ inch long. The large specimen in the Paris Museum (2½ feet long) is covered with round, brown spots.

Fin-rays:—D. 12; P. 20; A. 14; C. 9.

T. pilosus, (Guenther VIII. p. 316.)

Diodon pilosus, Mitch. Trans. Lit. & Phil. Soc. New York. I. p. 471, pl. 6, fig. 4.

Enters Chesapeake Bay from the ocean, but seems to be rare in Maryland waters.

III—TETRODONTIDÆ.

TETRODON. Linne'.

T. LÆVIGATUS.

The Lineated Puffer, or Smooth Swell Fish.

Body elongated, cylindrical, gradually tapering behind: anterior portion of body most prominent; abdomen pendulous, and furnished with small three-rooted spines. Uniform deep olive-green above, sides silvery, abdomen white.

Fin-rays:—D. 13—14; P. 16—17; A. 12; C. 11—13.

T. lævigatus, L. Syst. Nat. I, p. 411; DeKay, New York Fauna, Fish. p. 329, pl. 56, fig. 182; Storer, Mem. Am. Acad. VIII, p. 418 pl. 34, fig. 1.

— *mathematicus*, Mitch. Lit. & Phil. Trans. New York, I, p. 474, pl. 6, fig. 6; Storer, Boston Journ. Nat. Hist. IV, p. 183.

Atlantic coast of Worcester county and in the southern part of Chesapeake Bay.

Acad. Coll.

CHILICHTHYS, Mull.

C. turgidus.

The Common Puffer, or Rough Swell Fish.

Body oblong, cylindrical, and nearly globular when inflated. The whole surface, except the chin and the space behind dorsal and anal fins, covered with small acute spines with trifid bases; these prickles are most numerous between the eyes and on the back. Dark olive-green above, with a yellowish tinge along the sides. Sides and all beneath white, with occasionally a greenish tinge, and barred transversely by seven or eight blackish, irregularly defined bands.

Fin-rays:—D. 6—8; P. 15; A. 6—8; C. 6—9.

C. turgidus, Schœpff, Beobacht. Ges. Ntrf. Freunde, Berlin, VIII, p. 189; Mitch. Lit. & Phil. Trans. New York, I, p. 473, pl. 6, fig. 5; DeKay, New York Fauna, Fish., p. 327, pl. 55, fig. 178; Storer, Mem. Am. Acad. VIII, p. 416, pl. 33, fig. 5.

Common during the summer in the St. Mary's River; said to take the hook quite readily. It is found in many sections of both peninsulas, including the Atlantic coast of Worcester county.

Acad. Coll. S. I.

IV.—OSTRACIONTIDÆ.

LACTOPHRYS, Swainson.

L. trigonus.

The Trunk-Fish.

Body triangular, covered with hexagonal plates, each with six raised lines, diverging from the centre to the angles; these plates are larger posterior to the pectoral fins. A flat, prominent, recurved spine is situated on each side of the posterior portion of the abdomen. The color above is a light leaden, darker between the dorsal and caudal; abdomen white.

Fin-rays:—D. 10; P. 12; A. 10; C. 10.

L. trigonus, L. Syst. Nat., p. 408.

Ostracion yalei, Storer, Bost. Journ. Nat. Hist., I, p. 353; pl. 8.

Lactophrys yalei, DeKay, New York Fauna, Fish, p. 342, Storer, Mem. Am. Ac. VIII, 1861, p. 429, (pl. 35, fig. 3.)

Occurring very rarely in the salt waters of the southern part of Chesapeake Bay, and around the extremity of St. Mary's county.

Acad. Coll. S. I.

V.—BALISTIDÆ.

ALUTERA, Cuv.

A. cuspicauda.

The Long-Tailed File-Fish.

Body elongated; compressed, high; back nearly horizontal between the dorsal fin and spine; face even, sloping; abdomen regularly arched. The mouth is projected, small and upturned; scales scarcely visible. Yellowish brown, varied with irregular dashes and blotches, so that scarcely any two individuals are precisely similar. The dorsal spine is stout, short, serrated, and has a furrow behind it for its reception. Tail lancet-shaped, and nearly half the length of the body.

Fin-rays:—D. 1.38; P. 13; V. 0; A. 42; C. 12.

A. cuspicauda, (teste Gill.)

Balistes cuspicauda, Mitch. Am. Month. Mag. II. p. 326.

Aluteres cuspicauda, DeKay, New York Fauna, Fish. p. 338, pl. 59, fig. 192; Storer, Mem. Am. Ac. VIII. 1861. p. 427, (pl. 35, fig. 2.)

Collected in the St. Mary's River, in small numbers.

Acad. Coll.

STEPHANOLEPIS, Gill.

S. MASSACHUSETTENIS.

The Massachusett's File-Fish.

Body oblong, very much depressed; skin covered with small stellated plates, which are so disposed as to feel slightly rough only when the hand is moved towards the head.—The strong, granulated, curved spine, representing the first dorsal fin, is half the length of the head, and has a double series of sharp, decurved teeth behind; yellowish brown, with faint abbreviated brownish blotches along the sides, most obvious upon the upper portion.

Fin-rays: D. 1. 34 : P. 12—15 : A. 30—34 : C. 12—13.

S. *Massachusettensis*, Storer, Fish. Mass. p. 174, and Mem. Am. Ac. VIII. p. 425, (pl. 34, fig. 4): DeKay, New York Fauna, Fishes, p. 336, pl. 57, fig. 187.

Enters Chesapeake Bay from the ocean. Belongs to the region of salt water.

VI.—HIPPOCAMPIDÆ.

HIPPOCAMPUS, Leach.

H. HUDSONIUS.

The Hudson River Sea-Horse.

Body heptagonal, composed of twelve segments, armed each side with three rows of prominent spines, formed by the junction of the plates, and a single row beneath. On the summit of the head is a large bony protuberance, terminating in five distinct points. Length of the head is more than one-fifth the entire length, and the prehensile tail is longer than the body, quadrangular, and divided into 32 segments. Color light brown, with iridescent opercles.

D. 18 : P. 15 : A. 3.

H. hudsonius, DeKay, Faun. New York, Fish, p. 322, pl. 53, fig. 171; Storer, Mem. Am. Acad II. p. 491, and VIII. p. 416, pl. 33, fig. 4; Lockwood, Amer. Nat. 1867, p. 225.
— *brevirostris*, Storer, Report p. 167.

Syngnathus hippocampus, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 475.

Enters the brackish water from the ocean, but seems to be uncommon. Specimens have been taken in St. Mary's River, in Sinepuxent Bay, on the ocean coast of Worcester county, and in Chincoteague Bay.

ACAD. COLL.

VII.—SYNGNATHIDÆ.

SYNGNATHUS, Artedi.

S. PECKIANUS.

The Banded, or Smaller Pipe-Fish.

Body elongate, compressed upon the sides, flattened above, gradually tapering from the head to the tail, and covered with horny plates. Greenish brown above, with several irregular, transverse, broad, dark bands; numerous narrower bands of the same color upon the sides. Abdomen pinkish.

Fin-rays:—D. 45; P. 14; A. 3; C. 12.

S. peckianus, (Guenther.)

peckianus, Storer, Report p. 163 and Synops. Fishes N. Amer. p. 490, and Mem. Am. Ac. VIII. p. 412, pl. 33, fig. 3.

—*fuscus*, Storer, Report, p. 162.

—*fasciatus*, DeKay, New York Faun., Fishes, p. 319, pl. 54, fig. 174.

— *viridescens*, DeKay, l. c. p. 321; pl. 54, fig. 176.

Occurs in the mouths of large rivers near salt water.

One specimen has been recently obtained from the St. Mary's River.

ACAD. COLL.

VIII.—MALTHEIDÆ.

MALTHE, Cuv.

M. VESPERTILIO.

Bat-Fish, Sea Bat, Nose-Fish.

Seen from above the body is ovate, depressed, expanded sideways like shoulders, to which the pectoral fins are attached, and tapering towards the tail. Skin like shagreen, with scattering long tubercles. Pale grayish-brown above, and pale reddish beneath.

Fin-rays:—D. 4; P. 11; V. 5; A. 4; C. 9.

M. vespertilio, Linn. Cuv. & Val. XII, p. 446; Cuv. Regne Anim. Ill. Poiss., pl. 85, fig. 2; DeKay, New York Fauna, Fishes, p. 167.

Rare in the southern part of Chesapeake Bay.

ACAD. COLL.

IX.—LOPHIIDÆ.

LOPHIUS, Artedi.

L. AMERICANUS.

The American Angler, Goose or Monk-Fish.

Body flat, head broad and depressed. Surface covered with a smooth skin, with fleshy processes along the flanks extending to the base of the caudal fin. Olive brown above, beneath white.

The first isolated ray of the first dorsal fin is very long, and supports on its apex a fleshy slip.

Fin-rays: D. 3. 3. 12; P. 25; V. 1. 5; A. 10; C. 9.

L. americanus, Cuv. & Val. XII, p. 380; DeKay, New York Fauna, Fishes, p. 162, pl. 28, fig. 87.

Found in the salt waters near and in the ocean, and in the drains of Worcester county.

X.—ANTENNARIIDÆ.

PTEROPHRYNE, Gill.

P. LAEVIGATA.

The Smooth Mouse-Fish, or Toad-Fish.

Body compressed, thickest about the pectorals; greatest depth half of the total length. Surface of the body smooth. Brown, tinged with reddish, with irregular blackish and small white spots on the sides; brown transverse, bars across the dorsal, pectoral and caudal fins.

Fin-rays: D. 11: P. 8: V. 5: A. 7: C. 9.

Between the eyes is a cylindrical soft ray, and behind and above this are two other soft rays, enveloped in a common granular membrane.

Chironectes lævigatus, Cuv. Mem. Mus. III, p. 423, pl. 16, fig. 1; Storer, Rep. Mass., p. 73; DeKay, New York Fauna, Fish, p. 165, pl. 27, fig. 83.

Occurs in the oyster regions of Chesapeake Bay, but is perhaps quite uncommon

XI.—SOLEIDÆ.

ACHIRUS, Lac.

A. LINEATUS.

The Hog Choker; The American Sole.

Oval, approaching to orbicular, flat; scales small, ascending high upon the dorsal, aval and caudal fins, lateral line nearly straight. Head, body and fins, greenish brown, with numerous black blotches. Eyes, and colored surface on the right side.

Fin-rays:—D. 56: V. 4: A. 40: C. 16.

There are two patterns of marking on this species of fish, the one with zig-zag bands, and the other spotted; some of the intermediate links are in the collection of the Maryland Academy of Sciences.

Pleuronectes achirus, L. Syst. Nat. 10th edit, 1, p. 268.

Achirus fasciatus, Lacep. IV, pp. 659, 662.

Pleuronectes mollis, Mitch. in Lit. & Phil. Trans. New York, I, p. 388, pl. 2, fig. 1.

Achirus lineatus, Cuv. Regne Anim.

— *mollis*, Storer, Syn. Fish, N. A., p. 228, and Fish. Massach. p. 119; DeKay, New York Fauna. Fish. p. 303, pl. 49, fig. 159.

Solea achirus, Guenth, IV, p. 476.

Immensely abundant in the Potomac River, south of Fort Washington; also in its tributaries in Charles and St. Mary's counties.

ACAD. COLL. S. I.

XII.—PLEURONECTIDÆ.

PSEUDOPLEURONECTES, Bl'kr.

P. AMERICANUS.

The Common Flounder.—The New York Flat-Fish.

Elliptical, flat. Scales small and of nearly equal size throughout. Just before the anal fin is a sharp horizontal spine; lateral line makes a slight curve above the pectoral fin; eyes and colored surface on the right: color very variable, usually pale greenish, with small brownish, irregular clouds or patches over the body and fins: beneath pearly white.

Fin-rays:—D. 67: P. 10: V. 6: A. 46: C. $17\frac{3}{3}$.

P. americanus, Walb. Art. III, p. 113.

— *plana*, Mitch. in Phil. & Lit. Trans. New York, I, p. 387.

Platessa plana, Storer. Fish. Massach., p. 140; DeKay, New York Faun., Fish. p. 295, pl. 48, fig. 154, pl. 49, fig. pl. 49.

— *pusilla*, DeKay. l. c. p., 296, pl. 47, fig. 153.

Occasionally seen in our market, but never in large numbers. It comes from the southern part of Chesapeake Bay. Also, in the Potomac River on the coast of St. Mary's county.

ACAD. COLL.

MYZOPSETTA. Gill.

M. FERRUGINEA.

The Rusty Flat-Fish..

Elliptical, flat. Scales cover the opercular plates, and are smaller towards the abdomen and tail. Lateral line curves suddenly over the pectoral fin, and runs thence in a straight line. Head and body greenish, with numerous irregular, rust-colored spots, not extending over the fins. Four or five obscure, rounded spots along the dorsal and abdominal outline.

Fin-rays:—D. 81; P. 10; V. 6; A. 59; C. 14$\frac{3}{2}$.

Platessa ferruginea, Storer, Fish. Massach., p. 141, pl. 2: DeKay, New York Fauna, Fish, p. 297, pl. 48, fig. 155.

Pleuronectes ferrugineus, Guenth, IV, p. 447.

Occasional in the southern part of Chesapeake Bay.

LOPHOPSETTA. Gill.

L. MACULATA.

The Spotted Turbot.

Nearly orbicular and flat; scales minute and adherent; lateral line regularly arched over the pectoral, and then straight in a slight furrow to the tail; dark olive-brown above, with rounded, deep chocolate-brown spots on the body, and a few distant, light-colored spots, underside bluish white. Eyes and colored surface on the left.

Pleuronectes maculatus, Mitch., Report in part on the fishes of New York, p. 9; DeKay, New York Fauna, Fish p. 301, pl. 47 fig. 151.

Rhombus aquosus, Cuv. Regne Anim. Guenther, IV p., 411.

Several years since this species was frequently brought to the Baltimore markets from the Eastern Shore, but for a few years past it has not been brought to this city.

CHÆNOPSETTA, Gill.

1. C. OCELLARIS.

The Long-Toothed Flounder.

Body oblong and flat. Scales adherent, and extending over the opercles. Lateral line with a short and rapid curve over the pectorals, and thence straight. Olive brown, with from 6 to 10 black spots bordered with white, and numerous obscure pale spots. Eyes and colored surface on the left.

Fin-rays:—D. 95; P. 12; V. 6; A. 72; C. $16\frac{2}{2}$.

Platessa ocellaris, DeKay, New York Fauna Fishes, p. 300, pl. 47, fig. 152,

Has been caught in seines near the entrance to Chesapeake Bay.

S. 1.

2. C. OBLONGA.

The Oblong Flounder.

Oblong, flat-Scales small, deeply imbedded, and extending far up the caudal fin. Lateral line straight from the tail, until it reaches near the tip of pectoral, when it suddenly rises, curving convexly above it, and then proceeds with a gentle concave curve to the upper angle of the branchial curve. Dark olive-green, with lighter spots (sometimes absent) on the head and body. Eyes and colored surface on the left.

Fin-rays: D. 88; P. 12; V. 6; A. 66; C. 17.

Pleuronectes oblongus, Mitch. in Trans. Lit. & Phil. Soc. New York, I, p. 391.

Platessa oblonga, DeKay, New York Fauna, Fishes, p. 299, pl. 48 fig. 156.

Pseudorhombus oblongus, Guenth. III p. 426.

Grows to be 2 feet in length, and is caught in seines on both shores of Chesapeake Bay in its more southern parts.

Strings of the medium and smaller sizes find a ready sale in the Baltimore markets.

ACAD. COLL.

XIII.—AMMODYTIDÆ.

AMMODYTES, Artedi

A. AMERICANUS.

The Sand Lance.

Body elongate, subcompressed, covered with very minute scales. Head flattened above, compressed on the sides. Head and body above bluish brown, intermixed with silvery and light green; sides and beneath silvery.

D. 56: P. 13: A. 27: C. 17.

A. americanus, Guenther, I. p. 386.

—— *tobianus*, Mitch. Lit. & Phil. Trans. N. York, I. p. 363; Storer, Fishes Massach., 159.

—— *americanus*, DeKay, New York Fauna, Fish, p. 317, pl. 53, fig. 167.

Occasional in the Ocean on the coast of Worcester county.

XIV.—BLENNIIDÆ.

BLENNIUS, Artedi.

B. FUCORUM.

The Sea-Weed Blenny.

Body small, cylindrical, and scaleless; head large, deeper than long; the large and very prominent eyes project beyond the face: a thread-shape cirrus, bifid at tip, and nearly as long as the head, projects from the upper part of each orbit. Soiled greenish, brownish above, with numerous brown spots on the cheeks and sides of the body; throat and belly faintly rosaceous.

Fin-rays:—D. 11. 17: P. 14: V. 3: A. 18: C. 14.

B. fucorum, Cuv. & Val. XI., p. 263, pl. 324: DeKay, New York Fauna, Fish, p. 149, pl. 22, fig. 66.

Inhabits the Ocean drains of Worcester county, and in the oyster regions south of Tangier Sound.

CHASMODES, Cuv. & Val.

C. QUADRIFASCIATUS.

The Four-Banded Shanny.

Body cylindrical, with a thick head; mouth very large; dorsal fin not connected with the caudal. Color light brown, with four (or five) brown cross-bands; along the base of the anal fin is a series of round yellowish spots.

Fin-rays:—D. 27: P. 14: V. 3: A. 15: C. 15.

C. quadrifasciatus, Guenther, I. p. 229.

Pholis quadrifasciatus, Wood, Journ. Acad. Nat. Sc., Philad., IV. p. 282, pl. 17, fig. 1.

Chasmodes quadrifasciatus, Cuv. & Val. XI. p. 298.

Found in St. Mary's River, and near the mouth of the Potomac.

ACAD. COLL.

XV.—BATRACHIDÆ.

BATRACHUS, Bloch. Schn.

B. TAU.

The Oyster-Fish, or Common Toad-Fish.

Body thick, rounded before, compressed behind. Head very broad, depressed, as wide as long, with full cheeks, appearing as if bloated. Mouth enormous; eyes prominent and close together. Skin without scales, covered with a thick coat of slime. Color light brown, clouded and mottled with dark brown and olive-green: belly flesh-colored.

Fin-rays: D. 3.26: P. 18: V. 3: A. 21: C. 15.

B. tau, Guenther III. p. 167.

Gadus tau, L. Syst. I. p. 440.

Lophius bufo, Mitch. Lit. & Phil. Trans. New York, 1. p. 463.

Batrachoides vernullus, Lesueur, Mem. Mus. V. p. 157. pl. 17.

Batrachus variegatus, Storer, Rep. Massach. p. 74.

— *tau*, Cuv. & Val. XII. p. 478; DeKay, New York Faun., Fish. p. 168, pl. 28, fig. 86.

— *celatus*, DeKay, l. c. p. 170, pl. 50, fig. 161, (young).

Lives in the mud of the oyster regions of Chesapeake Bay, around the mouth of the Potomac River and elsewhere in salt water.

ACAD. COLL. S. I.

XVI.—URANOSCOPIDÆ.

ASTROSCOPUS, Brev.

A. ANOPLUS.

The Unarmed Uranescope.

Body cylindrical, without scales: head large and flattened: eyes large, vertical, close together. Back above greenish, and, together with the extremity of the lower jaw, minutely punctate with black. First dorsal fin blackish: pectorals greenish: the remaining fins white, tinged with yellow.

Fin-rays:—D. 4.1.12: P. 19: V. 1.5; A. 12: C. 11¼.

Uranoscopus anoplos, Cuv. & Val. VIII. p. 493; DeKay, New York Fauna, Fishes. p. 37, pl. 22, fig. 65.

Astroscopus anoplus. Baird's Rep.

Agnus anoplus, Guenth. II. p. 229

Occurs occasionally in the southern part of Chesapeake Bay.

XVII.—CYCLOPTERIDÆ.

CYCLOPTERUS, Artedi.

C. LUMPUS.

The Common Lump-Fish, or Lump-Sucker.

A remarkably thick and stout fish, nearly orbicular in outline, looking like a lump of gelatinous matter. The scaleless skin is roughened by warts, forming three rows of lumps or processes on each side. On the ridge of the back are 5 to 7 large, compressed warts, behind which is a deep oblique fissure. These lumps or processes look like the plates on the sides of a Sturgeon, but are not so hard or well defined. The belly is broad and flat, with an elliptical organ formed by the pectoral fins for adhering to other bodies. Back and sides deep blue, thickly marked with small black elevations: belly pale green and white.

Fin-rays:—D. 12; P. 20; A. 10; C. 11.

C. lumpus, L. Syst. Nat. I. p. 414; Richards. Faun. Bor. Amer. Fishes, p. 260.

- *cæruleus*, Mitch. Lit. & Phil. Soc. New York, I. p. 480, pl. 2, fig. 7.

In the ocean drains of Worcester county.

XVIII.—GOBIIDÆ.

GOBIOSOMA, Girard.

G. ALEPIDOTA.

The Variegated Goby.

Body oblong, cylindrical, slightly compressed on the sides: its surface totally destitute of scales. Head broad, flattened behind the eyes, which are very close together, and only separated by a narrow furrow. Greenish brown, with seven or eight paler transverse bars over body and tail: fins dark brown, caudal fin with two or three curved bars.

Fin-rays:—D. 6. 14: P. 17: V. 12—13: A. 11: C. 19.

G. alepidota Guenther III p. 85.

Gobius aledotus., Sch. p. 547; DeKay, New York. Fauna, Fish. p. 160, pl. 23 fig. 70.

— *boscii*, Lacep. I p. 555, pl. 16 fig. 1.

— *viridipallidus*, Mitch. Trans. Lit. & Phil. Soc. New York, I p. 379, pl. 1 fig 8.

Gobiosoma alepidotum. Girard, Proc. Acad. Nat. Sc. Phil. 1858, p. 169.

In the waters of Worcester county, along the shores of Sinepuxent Bay. Probably scarce.

XIX.—TRIGLIDÆ.

DACTYLOPTERUS, Lacep.

D. VOLITANS.

The Sea-Swallow.

Body cylindrical, tapering towards the tail. Head four-sided, broader than high, descending nearly vertically in front. Body covered with rough, solid scales, with a prominent crest on each. The pectoral fins consist of two portions, of which the posterior one is the largest, forming wings.—Light brown above, darker on the summit of the head, with irregular darker spots. Sides silvery, with flesh color predominating beneath. Dorsals gray, with brown spots on the membrane of the first. The posterior pectorals blackish, with bluish spots; the anterior dark brown, varied with black. Ventrals and anal fins flesh colored. Caudal fin light brown, with irregular brownish bands.

Fin-rays:—D. 2. 4. 1. 8; P. 6. 30: V. 1. 4; A. 6: C. 10^{5}_{5}.

D. volitans Guenther, I p. 221.

Trigla volitans, L. Gm. p. 1346; Bl. Taf. 351.

Dactylopterus pirapeda, Lacep. III p. 326.

volitans, Cuv. & Val. IV, p. 117; DeKay, New York Fauna, Fish., p. 49, pl. 17 fig. 46.

Polynemus sexradiatus, Mitch. Trans. Lit. & Phil. Soc.

New York, I pl. 4 fig. 10, and Am. Monthly Mag. I p. 323.

In the tide drains on the ocean coast of Worcester county, and in the lower part of Chesapeake Bay.

Acad. Coll.

PRIONOTUS (Lacep.) Cuv. & Val.

P. LINEATUS.

The Banded Gurnard, or Sea-Robin.

Cylindrical, broadened in front, tapering rapidly towards the tail; head broader than the body, composed of seven distinct bony plates, the first rough, covering the whole front and upper part of the head, ending behind in two stout spines; over the eyes both before and behind are smaller spines; and with a stout spine at the base of the forward gill-cover, attached to a serrated ridge; gill-cover triangular, with two spines behind, the upper one directed upwards, and the lower one larger and directed backwards. Scales small; the lateral line curving downwards from the upper part of the gill openings. Fingers three, long, placed under the base of the pectoral fins, the longest being nearly one-half as long as these fins. First dorsal set in a groove, the first ray serrated along its whole length, and the two following rays less serrated: the pectoral fins extend to the middle of the second dorsal, broad and bluntly-pointed, almost black and with reddish bands; caudal uneven, slightly reddish, almost lunate.—Color rich dark brown, or tinged with slaty, with darker brown blotches irregularly placed; sides cream-yellow, marked with patches of iron-rust color; lateral line brown; beneath this is a broad reddish brown line extending to the tip, and there breaking up into series of short lines and spots; first dorsal pale with a black spot between the fourth and sixth rays; anal reddish.

Length 9-18 inches.

Fin-rays: D. 9, 12: P. 13. 3: V. 1, 5: A. 11: C. 15.

P. lineatus Guenther, II p. 192.

Trigla lineata, Mitch., Trans. Lit. & Phil. Soc. New York, I, p. 430, pl. 4 fig. 4.

Prionotus strigatus, Cuv. & Val. IV p. 86.

– *lineatus*, DeKay, New York Fauna, Fishes, p. 45, pl. 4 fig. 12.

Occurs in the same localities as the preceding species

ACAD. COLL.

P. CAROINUS.

The Web-Fingered Gurnard.

Body cylindrical, tapering towards the tail. Head depressed, with a deep depression between the eyes, and ending in a bilobed snout: each lobe is furnished with blunt spines in front. Scales small, nearly square. Pectorals very large and broad, like wings; the fingers or fleshy processes, three in number, serve as important organs of touch. Color grayish, or chocolate brown. Dorsal and anal fins with pale, oblique bars. The first dorsal fin with a dusky, roundish spot between the fourth and fifth ray. Four to six obscure brownish bands across the back, obsolete on the sides.

Fin-rays: D. 10. 14; P. 14; V. 5; A. 12; C. $11.{}^{5}_{4}$

P. carolinus, Guenther, II, p. 192.

Trigla carolina, L. Mantissa, p. 528.

— *palmipes*, Mitch., Trans. Lit. & Phil. Soc. New York, I, p. 431, pl. 4, fig. 5.

Prionotus pilatus, Storer, Proc. Bost. Nat. Hist., II, p. 77, and Report Fish. Massach., p. 20, pl. 6, fig. 1: Baird, ninth Smithson. Report, p. 321.

— *carolinus*, Cuv. & Val., III, p. 90: Storer, Report. p. 14; DeKay, New York Fauna, Fish., p. 46, pl. 5, fig. 15.

Not uncommon about the mouth of the Potomac River, in Sinepuxent Bay, and along the eastern shore south of Tangier Sound.

ACAD. COLL. S. I.

XX—COTTIDÆ.

COTTUS, Artedi.

C. MERIDIONALIS.

The Barbut, or Miller's Thumb.

Form somewhat cylindrical, tapering posteriorly; head broader, forming nearly one-fourth of the total length, and being about as broad as long, rounded in front; with three spines on the forward gill-cover, the upper one stout, directed obliquely upwards and backwards; the intermediate one smaller, directed vertically downwards, and the lower one, still smaller, projecting obliquely forwards; the first dorsal fin commences a little behind the insertion of the ventral, its upper edge convexly curved; caudal fin shorter than the head, its posterior edge convex; color pale yellowish-gray, with slightly darker blotches, and on the fins with obsolete bands, composed of brownish spots. Length about 3 inches.

Fin-rays:—D. 7. 17; P. 14; V. 1. 4; A. 12; C. 17.

C. meridionalis, Girard, Smithson. Contrib. III, 1852, p. 47, pl. 1, fig. 9 & 10; Proc. Boston Soc. Nat. Hist., III, 1850, p. 189, and Proc. Amer. Assoc. Adv. Sc. II, 1850, p. 410.

It has been taken near Cumberland, and at Rohrersville, in Washington county.

ACAD. COLL.

C. VISCOSUS.

The Barbut, or Miller's Thumb.

Somewhat cylindrical, tapering posteriorly, head broader, convex, a little flattened, nose convex and snout obtuse, mouth wide, but less so than in the preceding species, and its angles do not extend back farther than the front rim of the eye; diameter of the eye contained about five times in the length of the head; spine of the forward gill-cover stout, prominent, acute, directed obliquely upwards, sometimes a smaller spine occurs at the base below this, having its point directed straight downwards: the one on the lower angle of the gill-cover is very conspicuous, acute, and directed as usual downwards and forwards: first dorsal fin uniformly arched, as is also the second dorsal; the origin of the anal fin is under the position of the fourth ray of the second dorsal: the caudal forms two-elevenths of the entire length: the ventral is inserted in advance of the position of the first dorsal fin. Color yellowish, clouded with blackish, the first dorsal fin margined narrowly with orange. Length 3—3¾ inches.

Fin-rays:—D. 8. 17; P. 12: V. 1. 3. A. 12: C. 18.

C. viscosus, Haldem. Suppl. Monogr. Limn. & C., 1840, p. 3; Girard, Proc. Amer. Assoc. Adv. Sc. II, 1850, p. 441, Proc. Bost. Soc. Nat. Hist., III, 1850, p. 189, and Smith's Contrib. III. 1852. p. 51, pl. 2. fig. 1. 2. pl. 3. fig. 1—9.

Not the Miller's Thumb of Annapolis, West River and the Patuxent, which belongs to the group of Toad Fishes. It occurs in Rock Creek, near Georgetown, D. C., and in some of the small streams near Baltimore.

XXI.—HEMITRIPTERIDÆ.

HEMITRIPTERUS, Cuv. & Val.

H. ACADIANUS.

The American Sea Raven.

Body oblong, cylindrical, tapering rapidly to the tail: head large, with irregular cavities, knobs and elevations; above the snout is an elevated crest on each side, with spinous projections; from several of these prominences arise finger-like slips, also ten or twelve similar ones are pendant from the lower jaw; surface of body covered with a granulated skin, upon which are rows of small conical tubercles. Surface of head, body and fins bright lemon-yellow or blood-red.

Fin-rays:—D. 16. 14; P. 18; V. 1. 3; A. 14; C. $12\frac{3}{3}$.

Cottus acadianus, Penn. Arct. Zool. III, p. 371.

— *tripterygius*, Bl. Schn., p. 63.

— *hispidus*, Bl. Schn., p. 63, pl. 13.

Scorpæna flava, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 382, pl. 2, fig. 8.

— *purpurea et rufa*, Mitch. Amer. Month. Mag., II, p. 245.

Hemitripterus americanus, Cuv. & Val., IV, p. 268, pl. 84; Storer, Rep. Mass., p. 23; DeKay, New York Faun., fish. p. 56, pl. 6, fig. 16; Cuv. Regne Anim. III. Poiss., pl. 22, fig. 1; Guenther, II, p. 143.

This species has occurred a few times in the seines hauled near the entrance to Chesapeake Bay and on the sea coast; but it must be in general rare in Maryland. It belongs more particularly to the coast of New England.

XXII.—LABRIDÆ.

TAUTOGA, Mitch.

T. ONITIS.

The Black-Fish, or New York Tautog.

Body elongate, compressed, and highest just above the dorsal fin; scales small, adherent; very small on the top of the head; lips thick and very fleshy. The color is remakably varied, but generally black, deep black or bluish-black; frequently pale bluish, with irregular bands of a deeper hue; lips, lower jaw and abdomen lighter, sprinkled with black points.

Fin-rays:—D. 17. 10; P. 17; V. 1. 5; A. 3. 8; C. 14?.

T. onitis, Guenther, III, p. 88.

Labrius onitis, L. Syst. Nat. I, p. 478; Lacep. III. p. 501.

— *americanus*, Storer, Syn., p. 137.

Tautoga nigra, Mitch. Report Fish, New York. 1814, p. 25.

Labrus tautoga, Mitch. in Lit. & Phil. Trans. New York, I, p. 398, pl. 3, fig. 1.

Tautoga nigra, Cuv. & Val. XIII, p. 293; DeKay, New York Faun., Fish, p. 175, pl. 14, fig. 39.

Caught on the ocean coast of Worcester county, and around the mouth of Chesapeake Bay. Feeds on mud crabs and shell-fish.

ACAD. COLL. S. 1.

XXIII.—EPHIPPIDÆ.

PAREPHIPPUS Gill.

P. FABER.

The Banded, Ephippus.

Form regularly oval: its height to its total length as four to seven: scales moderately large, ascending more than two-thirds of the distance along the fins: the dorsal fin consists of two portions: the first is formed by nine very short spines, the second is large and triangular: the anal is similar in shape and size to the second dorsal fin. Brownish, with six broad, vertical, dusky, bluish bands.

Fin-rays:—D. 9. 3. 22: P. 18: V. 1. 5: A. 3. 18: C. 16.

Chætodon faber, Bl. Taf., 212, fig. 2.

—*oviformis*, Mitch. Trans. Lit. & Phil. Soc. New York, I, pl. 5, fig. 1.

Ephippus faber, Cuv. & Val. VII, p. 213: DeKay, New York Fauna. Fish, p. 97, pl. 23, fig. 68: Holbr. Ichth. S Carol. p. 108, pl. 15, fig. 1: Guenth, II, p. 1.

Not uncommon in the salt waters of the region near the entrance to Chesapeake Bay, but is seldom, if ever, brought to the Baltimore markets.

Farther south it is caught in considerable numbers, and is regarded with favor as an article of food.

ACAD. COLL. S. 1

XXIV—XIPHIIDÆ.

XIPHIAS. Artedi.

X. GLADIUS.

The Sword-Fish.

Body elongate, cylindrical, highest near the beginning of the pectoral fin. Surface of body and head slightly roughened, with numerous series of tubercles, which disappear with age. Upper jaw short and pointed. The dorsal is a long, high, and nearly equal fin of 43 rays, extending nearly to the tail, but becoming for the greater part obliterated and divided into two fins. No ventral fins. The anal fin is likewise in the adult divided into two. Caudal fin crescent-shaped. Bluish-black above, silvery on the sides; sword dark brown above, whitish beneath.

Fin-rays;—Young:—D. 3, 40; P. 16; A. 17; C. $17\frac{4}{4}$

Adult:—D. 18, 3; P. 16; A. 11, 3; C. $17\frac{4}{4}$.

X. *gladius*, L. Syst. I p. 432; Cuv. & Val. III, p. 255, pl. 225, 226; Storer, Report, p. 51; DeKay, New York Fauna, Fish. p. 111.

Some times enters Chesapeake Bay from the Ocean.

XXV.—SCOMBRIDÆ.

SCOMBER. Artedi.

S. SCOMBRUS.

The Common Mackerel.

This important fish has a cylindrical, tapering form. Scales very minute. Eyes large. With longitudinal spurious fins on the sides of the tail, and a low spine before the first ray of the anal fin. Colors exceedingly vivid: dark steel-blue above, becoming lighter on the sides, beneath silvery white: with 24 to 30 vertical, deep-blue half-bands, and a black blotch at the base of the pectorals and ventrals.

Fin-rays:—D. 13, 10—VI; P. 17; V. 6; A. 12 V: C. $15\frac{8}{8}$.

S. scombrus, L. Syst. I p. 492.

S. vernalis, Mitch, Trans Lit & Phil. Soc. New York, I p. 423; Cuv. & Val. VIII, p. 48; Storer, Fish. Massach p. 41; DeKay, New York Faun. Fish. p. 101. pl. 12 fig. 34.

Much less common than formerly in the salt-water of Chesapeake Bay not remote from the Ocean.

ACAD. COLL.

S. COLIAS.

The Chub-Mackerel.

Body cylindrical, robust. Head considerably flattened above; eyes large. The first dorsal fin transparent: five dorsal finlets. Above light green, with numerous undulating, darker green lines passing down the sides, just crossing the lateral line. Beneath dull bluish, with large, round or oval, brown blotches distributed irregularly on the sides. Abdomen light-colored.

Fin-rays:—D. 9.12. V: P. 19: V. 5: A. 1.12. V: C. 17;.

S. colias, L. Gm. I. p. 1329; Lacep. IV. pp. 39, 40; Cuv. & Val. VIII. p. 39, pl. 209: Storer, Fishes of Massach. p. 45; DeKay, New York Fauna, Fishes, p. 104, pl. 11. fig. 33.

Enters the Chesapeake Bay from the ocean, but must be quite uncommon in Maryland waters.

SARDA, Cuv.

S. PELAMYS.

The Striped Bonito, or Skip-Jack.

Has the general form of the common Mackerel, but is a larger and more robust fish: its height to its length is as one to four. The scales are scarcely visible, except upon the so-called corselet, which is of a triangular shape, extending from the gill-opening to beyond the tip of the pectorals. Summit of head and upper part of the sides dark-plumbeous; abdomen and sides ashen grey, mixed with blue. There are 6—8 parallel, longitudinal, narrow, dark stripes, and (in young individuals) 6—8 broad, vertical, deep-blue bands, crossing the narrow longitudinal stripes at right angles. They become effaced, or are entirely wanting, in older specimens.

Fin-rays:—D. 22. 2. 12. IX; P. 24; V. 1.5; A. 2.12. VIII: C. 27.

S. pelamys, Cuv. & Val. VIII. p. 149, pl. 217; Storer, Fish. Massach. p. 4; DeKay, New York Faun. Fish. p. 106, pl. 6, fig. 27; Cuv. Regne. Anim. Ill. Poiss. pl. 48, fig. 2.

Scomber sarda, Bloch, X. p. 35, Taf. 334; Bl. Schn. p. 22: Mitch. Trans. Lit & Phil. Soc. New York, I. p. 428.

Found rarely near the entrance to Chesapeake Bay.

Acad. Coll.

CYBIUM, Cuv.

1. C. MACULATUM.

The Bay Mackerel. or The Spanish Mackerel.

Similar in shape and appearance to *Scomber colias*. Head pointed, and to the whole length as about 1 to 6; eyes and mouth large. Greenish above, shading into ashen-grey. Sides and all beneath white. About twenty yellowish rounded spots are distributed irregularly along the sides. First dorsal fin, as far as the eighth or ninth ray, black: pectorals black, with brown margins: ventrals and anals whitish.

Fin-rays:—D. 17.2.15 X: P. 22: V. 1.5: A. 2.15 IX: C. 22.

C. maculatum, Guenther, II. p. 372.

Scomber maculatus, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 426, pl. 6, fig. 8.

Cybium maculatum, Agassiz in Spix, Pisc. Brasil. p. 103; tab. 60; Cuv. & Val. VIII. p. 181; Storer, Bost. Journ. IV. p. 179; DeKay, New York Fauna, Fishes, p. 108, pl. 73, fig. 232; Holbr. Ichth. S. Car. p. 66, pl. 9, fig. 1.

Has been caught in large numbers in the Potomac River near its mouth; it is considered a great delicacy and as one of the finest food-fish in the market.

It is more solitary than the other fishes of the Mackerel family generally, and only 4 or 5 are taken at the same time.

Acad. Coll. S. 1.

2. C. regale.

The Black-Spotted Spanish Mackerel, King-Fish, or Cero.

Similar to the preceding, but with a broad, brownish, longitudinal stripe, and with roundish spots above and beneath.

C. regale, Guenther, II, p. 372.

Scomber regalis, Bloch, taf., 333; Lacep. IV, p. 711, V, p. 789.

Cybium regale, Cuv. & Val. VIII, p. 184.

Brought occasionally in small numbers from Chesapeake Bay near the Ocean, and commands a ready sale in the Baltimore markets.

Acad. Coll. S. 1.

XXVI.—CARANGIDÆ.

VOMER, Cuv.

V. setipinnis.

The Blunt-Nosed Shiner, Horse-Fish, or Bristly Dory.

Nearly oval in shape, body strongly compressed; tail small, cylindrical; back abruptly descending above the eye, forming a concave profile; no scales on the upper part of the body above the lateral line, and very small ones on the sides, becoming larger on the tail. Except on the long pectoral fins, all the rays are short. The whole body is of a lustrous silvery color, passing into leaden on the back; membrane of the second dorsal minutely punctured with black, tinged at its base with light yellow.

Fin-rays:- D. 7. 1. 23: P. 1. 18: V. 1. 3: A. 1. 18: C. 16½.

Zeus setapinnis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 384, pl. 1, fig. 9.

Vomer brownii, Cuv. Regne. Anim.: Agass. Spix, Pisc. Bras. p. 110, tab. 57: DeKay, New York Fauna, Fish, p. 127, pl. 25, fig. 78.

Argyreiosus setipinnis, Guenth., II, p. 459.

Not rare in Sinepuxent Bay, and in the southern parts of Chesapeake Bay.

ACAD. COLL.

ARGYREIOSUS, Lacep.

A. VOMER.

The Rostrated Dory.

Similar in shape to *Vomer setipinnis:* face oblique in front, horizontal from the nape to the second dorsal fin; snout prominent, projecting; tail very slender. Skin satin-like, without scales. The second ray of the first dorsal fin elongated into a thread half as long as the body, and sometimes twice as long; the second ray of the second dorsal fin also very long; pectorals long; ventral and anal fins very long. Lustrous silvery: dorsal and ventral filaments blackish.

Fin-rays:—1st D. 1. 44; 2nd D. 1. 22; P. 17: V. 1. 5; A. 2. 1. 18; C. 17.

A vomer, Lacep. IV, pp. 566, 567; Agass. Spix, Pisc. Bras. p. 109, tab. 58; Cuv. & Val. IX, p. 177, pl. 255; Cuv. Regne. Anim. Ill. Poiss. pl. 59, fig. 2: DeKay, New York Faun., Fish. p. 124, pl. 75, fig. 238.

Zeus niger, Bl. Schn., p. 90.

In the Potomac River near its mouth, in Sinepuxent Bay, and in the southern part of Chesapeake Bay: not rare.

ACAD. COLL.

CARANGUS, (Girard, Gill.)

C. HIPPOS.

The Horse Crevalle', or Southern Caran.

Form elliptical, much compressed; length of the head to the total length as two to nine; scales small, extending over the gill-covers, and high up on the base of the vertical fins; the lateral line is furnished on its straight portion with twenty five bony plates. commencing small at first. but becoming more elevated, ending in sharp three-sided spines. In front of the first dorsal fin, which is received in a furrow, is a short spine, directed forwards, and nearly concealed in the skin. Caudal fin deeply forked. The back is bluish; golden yellow on the sides; ventrals, anal and caudal fine yellow, the latter with dusky tips; chin satin-white; a dark round spot on the front margin of the opercle; another on the inner base of the pectoral, and occasionally a short black vertical bar across the middle of the pectoral fin.

Fin-rays:—D. 7. 1, 20; P. 20; V. 1. 5: A. 2. 17: C. 19.

Scomber hippos, L. Lyst. Nat. I, p. 494.

C. defensor, DeKay, New York Fauna, Fishes, p. 120, pl. 24, fig. 72.

Enters Chesapeake Bay, but is very rarely brought to the Baltimore markets.

ACAD. COLL.

TRACHYNOTUS. (Lacep.) Cuv. & Val.

T. CAROLINUS.

Pompano Crevalle.

Similar in shape to the preceding. The first dorsal fin is represented by six short spines, each with a short membrane, and preceded by a spine directed forward: the second dorsal and the anal fin with their first rays prolonged. The face abruptly cut off before the eyes.

The color of this fish is beautiful silvery, a little darker upon the back. When dead, it is golden, shaded with pale blue along the back.

Fin-rays:—D. 1.6.25: P. 16—18; V. 1.5; A. 2.20: C. $18\frac{9}{9}$.

Lichia carolina, DeKay, l. c. p. 114, pl. 10, fig. 30.

Bothrolæmus pampanus, Holbr. Ichth. S. Car. p. 83, pl. 11, fig. 2.

Doliodon carolinus, Girard, Proc. Acad. Nat. Sc. Philad. 1858, p. 168.

Rather uncommon in Chesapeake Bay, but is occasionally brought to the Baltimore markets. It feeds on various kinds of molluscous and crustaceous animals. It is considered the most delicious fish of the coast.

ACAD. COLL. S. I.

XXVII.—STROMATEIDÆ.

PORONOTUS, Gill.

P. TRIACANTHUS.

The Short-Finned Harvest-Fish, or Three-Spined Peprilus.

Body elliptical, much compressed; its height nearly one-half of its length. Scales small. The lateral line is scaly, and nearly concurrent with the back; besides this there is a counterpart of the lateral line, but curved in an opposite direction, and between this and the true lateral line is a third line: both are without scales. Brilliant metallic green, blue and golden. Deep blue on the back, and obscurely mottled in living specimens.

Fin-rays:—D. 3.45; P. 19; A. 3.42; C. 19.

P. triacanthus, Peck, Mem. Amer. Acad. II. pt. 2, p. 48, pl. 2, fig. 2.

—*cryptosus*, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 365, pl. 1, fig. 3.

Peprilus triacanthus, Storer, Rep. Massach. p. 60.

Rhombus triacanthus. DeKay, New York Fauna, Fish., p. 137, pl. 26, fig. 80.

Occurs in Sinepuxent Bay, and many parts of Chesapeake Bay, as far north as the Patapsco River.

PEPRILUS. Cuv.

P. GARDENII.

Long-Finned Harvest-Fish.

Oval: head and body much compressed: snout blunt: eyes large. Scales small, and little apparent, scarcely discernible on the fins, and wanting on the head and gill-covers. The rays of the dorsal fin increase rapidly in length from the fourth to the ninth, and rapidly decrease again to the eighteenth, after which they are short and equal: pectorals long and pointed: the anal is similar to the dorsal: the caudal is deeply forked. Silvery, with tints of blue and green: dusky on the head: blackish patches on the belly towards the tail, which appear red and purple in certain lights.

Fin-rays:—D. 3. 44; P. 23; A. 4. 43; C. $19\frac{3}{5}$.

Chætodon alepidotus, L. Syst. I, p. 460.

Sternoptyx gardenii, Bl. Schn. p. 494.

Stromateus longipinnis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 366.

Rhombus longipinnis, Cuv. & Val., IX, p. 401, pl. 274; DeKay, New York Fauna, Fishes, p. 136, pl. 75, fig. 239.

Peprilus longipinnis, Cuv. Regne Anim. Ill. Poiss. pl. 63, fig. 2.

Stromateus gardenii, Guenth. II, p. 399.

Occurs in Sinepuxent Bay and in the southern part of Chesapeake Bay.

ACAD. COLL.

XXVIII.—SCIÆNIDÆ.

CYNOSCION, Gill.

C. REGALIS.

The Salt-Water Trout, The Weak-Fish.

Body elongated, slightly elevated, rather compressed, and thicker above than below. Head broad behind, narrow at the snout, and slightly arched over the eyes. Pale brown above, with a strong greenish and purple tint, and marked with irregular dusky blotches: belly silvery: ventral and anal fins yellowish.

Fin-rays—D. 9, 1. 29; P. 16; V. 1. 5; A. 1. 13; C. 17.

Labrus squeteague, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 396, pl. 2, fig. 6.

Johnius regalis, Holbr. Ichth. S. Car., p. 127, pl. 18, fig. 1.

Otolithus regalis, Cuv. & Val. V, p 67; DeKay, New York Faun. Fish., p. 71, pl. 8, fig. 24; Baird, Ninth Smithson. Report, p. 329; Guenther, II, p. 307.

Sold in considerable numbers in the Baltimore markets, and is brought from the parts of Chesapeake Bay near the Ocean.

ACAD. COLL. S. 1.

POGONIAS, Cuv.

P. CHROMIS.

The Big Drum, or Drum-Fish.

This large fish is oblong, compressed, nearly straight on the belly, thin and much arched on the back. The head is large, slightly prominent between the eyes, and swollen at the sides. There are numerous white barbels at the chin and lower jaw. The dorsal fin is deeply emarginated, and but slightly elevated. Dull silvery, or lead colored, often with a coppery tint; a dusky blotch at the base of the pectoral fin.

Fin-rays—D. 10. 1. 22; P. 18; V. 1. 5. A. 2. 7; C. 17^{3}_{3}.

P. chromis, Cuv, & Val., V, p. 206.

Labrus chromis. L. Syst. Nat. p. 479.

Sciæna chromis, Bl. Schn. p. 82.

Pogonathus courbina, Lacep. V, p. 121,

Sciæna gigas, Mitch, Trans. Lit. & Phil. Soc. New York, I, p. 412, pl. 5, fig. 10.

—*fusca*, Mitch. l. c. p. 409.

Pogonias chromis, DeKay, New York Fauna, Fishes, p. 80; Holbr. Ichth. S. Car. p. 114, pl. 16, fig. 2.

Common in the ocean drains and in the oyster regions of the Eastern Shore.

Its flesh is much esteemed, and its roe is a great delicacy; considerable numbers are brought to the Baltimore markets in the Autumn and Spring.

In the spawning season it enters the different bays and inlets of salt-water to deposit its spawn, and then begins its drumming noise. This is made in the air bladder itself; the vibrations are produced by the air being forced by strong muscular contractions through a narrow opening, from one large cavity, that of the air-bladder, to another, that of the cavity of the lateral horn; and if the hands be placed on the sides of the animal, vibrations will be felt in the lateral horn, corresponding with each sound.

ACAD. COLL. S. I.

LIOSTOMUS, Lac.

1. L. XANTHURUS.

The Yellow Tail.

Long oval, compressed; head of moderate size, covered with scales as far as the lips, which are exceedingly thin. There are two dorsal fins, contiguous, and considerably elevated; the caudal is full, entire, with minute scales on its membrane. Head and body above the lateral line pale golden-brown; cheeks, opercle and body below that line silvery. Caudal fin yellow.

Fin-rays:—D. 11. 1. 32; P. 21; V. 1. 5; A. 2. 13; C. 17.

Liostomus xanthurus, Lacep IV. p. 439, pl. 10. fig. 1; DeKay, New York Fauna, Fish. p. 70.

Homoprion xanthurus, Holbr. Ichth. S. Car. p. 164, pl. 3, fig. 2.

Sciæna xanthurus, Guenth. II p. 288.

Common in the lower Potomac, in the southern part of Chesapeake Bay, and in Sinepuxent Bay.

In Worcester county it is called "White Perch."

It has habits similar to the *Liostomus obliquus*, and is taken with the same kind of bait.

ACAD. COLL.

2. L. OBLIQUUS.

The Croaker, or Spot.

Similar in shape to the preceding, but much more arched above, and nearly straight below. The head is large, compressed at the sides, full, rounded above and in front, and covered with scales. There are two dorsal fins, though connected by a membrane slightly elevated. Body above lightest silver-gray, with a golden tint; fourteen or more dusky bars descend obliquely on the sides from the margin of the back, and disappear below the lateral line a roundish spot above the pectoral fins; sides and belly yellowish.

Fin-rays:—D. 10. 1. 30; P. 18; V. 1, 5; A, 2, 12; C. 18.

Mugil obliquus, Mitch. Trans. Lit. & Phil. Soc. New York. I p, 405.

Sciæna multifasciata, Lesueur, Mem. Aca. Nat. Sc. Philad. II p. 225.

Leiostomus humeralis, Cuv. & Val. I p. 141, pl. 110.

—*obliquus*, DeKay, New York Fauna, Fish., p. 69, pl. 60, fig. 195; Holbr. Ichth. S. Car. p. 160, pl. 23 fig. 1.

Sciæna obliqua, Guenther, II p. 288.

The Croaker or Spot is common in many of the brackish and salt waters of the estuaries of Chesapeake Bay. In the vicinity of Norfolk and on the southern part of the Eastern Shore it is esteemed as the choicest of the indigenous fish.

Near Baltimore, in the Patapsco River, it lives in holes, and feeds on the small crustacea which abound there.

ACAD. COLL. S. I.

SCIÆNOPS, Gill.

S. OCELLATUS.

Sea-Bass, or The Branded Corvina, or Beardless Drum.

Elongated, nearly round, slightly arched above, straight below, thicker along the back, and thinner at the belly. Head large, flattened above; snout rounded, full, with a dependent fold of skin, partially divided into four lobes. Silvery white, with a bluish tint along the back, and an oval black spot (sometimes with two spots) bordered with white, near the upper margin of the base of the caudal fin.

Fin-rays:—D. 10. 1. 25; P. 17; V. 1. 5; A. 2. 7; C. 17.

Perca ocellata, L. Syst. Nat. p. 483.

Sciæna imberbis, Mitch. Trans. Lit. & Phil. Soc. New York. 1 p. 411.

Corvina ocellata, Cuv. & Val. V p. 134, pl. 108; DeKay, New York Fauna, Fish. p. 75, pl. 21 fig. 61; Holbr. Ichthyol. S. Car. p. 150, pl. 21 fig. 2.

Sciæna ocellata, Guenther, II p. 289.

Brought in the autumn and winter to the Baltimore markets, and highly esteemed for the table. It inhabits the salt waters of the southern part of Chesapeake Bay and coast of Worcester county, feeding on fish, shrimps, etc.

ACAD. COLL. S. I.

MICROPOGON, Cuv. & Val.

M. UNDULATUS.

The Croaker.

Similar in shape to the preceding: head long, elevated behind; with a full and rounded snout, and minute barbels at the chin. Body silvery, slightly shaded above, and marked with numerous minute, dusky spots, generally disposed without order, though rarely confluent, representing interrupted lines: these spots disappear below the plane of the pectoral fins, and leave the belly white.

Fin-rays:—D. 10.1.27; P. 14; V. 1.5; A. 2.8; C. 17.

M. undulatus, Guenther II. p. 271; Catesby, Carol. II, p. 3. tab. 3, fig. 1.

Perca undulata, L. Syst. Nat. p. 483.

Sciæna croker, Lacep. IV, pp. 309, 314, 316.

Micropogon undulatus, Cuv. & Val. V, p. 219; DeKay, New York Fauna, Fish, p. 84; Holbr. Ichth. S. Car., p. 146, pl. 21, fig. 1.

Brought to the Baltimore markets from the southern part of Chesapeake Bay. It occurs in Sinepuxent Bay, and is much valued for food. In South Carolina they call it "The Croaker."

Acad. Coll. S. I.

LARIMUS. Cuv. & Val.

L. FASCIATUS.

The Banded Drum.

This fish is very similar to *Pogonias chromis*, as well in form, as in its individual parts. The ground color of the whole animal is silvery, more or less shaded along the head and back above: the sides are marked with several vertical dusky bars, more or less distinct; the belly is white.

Fin-rays:—D. 10.1.22; P. 17; V. 1.5; A. 2.7; C. 17.

L. fasciatus, Lacep III, p. 137; Cuv. & Val. V. p. 210, pl. 118; DeKay, New York Fauna, Fish, p. 81, pl. 14, fig. 40; Holbr. Ichth. S. Car. p. 118, pl. 16, fig. 1.

Labrus grunniens, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 405, pl. 3, fig. 3.

It is quite numerous in the bays along the ocean coast, and an excellent article of food. It feeds, like *Pogonias chromis*, on molluscous and crustaceous animals.

Acad. Coll.

XXIX.—SPARIDÆ.

ARCHOSARGUS, Gill.

A. PROBATOCEPHALUS, (Wahl.) Gill.

The Sheepshead.

Nearly oval in form, compressed, thicker and nearly straight at the belly; thinner and greatly arched along the back, with its greatest elevation opposite the sixth dorsal spine. The head is large, compressed, elevated, full between the prominent orbits, and with a narrow, rounded snout. The head is dusky above, often with a bronzed or greenish tint; body silver-grey above, shining silvery-white on the sides, and marked with seven transverse, bluish-black bars.

Fin-rays: —D. 12.12: P. 16: V. 1.5: A. 3.11: C. 17.

Sparus ovis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 392, pl. 2, fig. 5.

Sargus ovis, Cuv. & Val. VI, p. 53: Storer, Report, p. 36; DeKay, New York Fauna, Fish, p. 89, pl. 8, fig. 23: Holbr. Ichth. S. Car. p. 54, pl. 8, fig. 2: Guenther, I, p. 447.

Frequents the oyster localities of all parts of Chesapeake Bay, but is now more common along our south-eastern counties, where it goes in small numbers to feed on the animals of the oyster bars; for the same reason wrecks of old vessels, on which barnacles and shells abound, are favorite resorts.

The fishermen of the lower part of the Eastern Shore go out in boats at night, and by the light of a pine knot or torch, strike them with a gaff, as they remain quietly balanced near the bars. In this way a single fisherman will sometimes capture as many as twenty in a single trip, and the specimens of which will weigh from 10 to 25 pounds. P. R. U.

ACAD. COLL. S. I.

LAGODON, Holbr.

L. RHOMBOIDES.

The Rhomboidal Porgy.

Nearly oval in shape, compressed. The head is small, uncovered, with scales in front of the eyes. Head above pale brown, with small golden spots; lips white; sides of head marked with several alternate pale blue and golden lines; the body above the lateral line marked with similar lines of the same color, but more clouded, slightly arched and concentric. Below the lateral line these are horizontal, and parallel to the belly, where the blue lines disappear, and are replaced with alternate white and golden lines; belly white; a dusky spot above the root of the pectoral fin. Before the twelve erect spines of the single dorsal fin is a small recumbent spine.

Fin-rays:—D. 1. 12. 11; P. 14; V. 1. 5; A. 3. 11; C. 17.

Sparus rhomboides, L. Syst. Nat. I. p. 427.

Sargus rhomboides, Cuv. & Val. VI. p. 68. pl. 143. cop. by DeKay, New York Faun, Fish. p. 93. pl. 71. fig. 228.

Lagodon rhomboides, Holbr. Ichth. S. Car. p. 59. pl. 8. fig. 1.

Sargus rhomboides, Guenther I. p. 447.

It enters the drains of our Ocean-coast, and is occasionally caught in the lower part of Chesapeake Bay, where it feeds on the crustaceous animals and smaller fish.

ACAD. COLL.

STENOTOMUS, Gill.

S. ARGYROPS.

The Big Porgy, The Fair Maid.

Form without the tail nearly oval: much compressed; arched above; thin in front of the dorsal fin; thicker and nearly straight at the belly. Head short, much elevated; eyes large; color silvery below, iridescent, and often with a greenish or bluish tint above. The single dorsal fin, placed in a groove of scales, is preceded by a short recumbent spine: the pectoral is narrow and long.

Fin-rays:—D. 1. 13. 12: P. 16: V 1. 5: A. 3. 12: C. 17.

Sparus argyrops, Linn. Syst. Nat. p. 471.

—*xanthurus*, Lacep. IV. p. 120.

Labrus versicolor, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 404. pl. 3. fig. 7; Agassiz in Spix. Pisc. Brasil. p. 117, tab. 64; DeKay, New York Fauna, Fish, p, 95, pl, 9. fig. 25; Baird, Ninth Smithson. Report, p. 333; Holbr. Ichth. S. Car. p. 175. pl. 25. fig. 1.

Pagrus argyrops, Guenther, I. p. 472.

It is a good fish, and is brought to the Baltimore markets in small numbers, from the southern part of Chesapeake Bay

ACAD. COLL. S. I.

XXX.—PRISTIPOMATIDÆ.

HÆMULON, Cuv.

H. FORMOSUM.

The Squirrel Fish.

The body is nearly oval, compressed; the back arched; snout produced. The scales are large; largest on the sides of the body, smaller beneath and on the head, extending to the very tips of the pectoral, dorsal and caudal fins. Bluish stripes (10 to 12) on the cheeks, bordered with brown, on a more or less gilded ground; remainder of the body golden grey, without lines. The dorsal fin with its twelve spinous rays, is exceedingly robust and acute, and received into a sheath.

Fin-rays:—D. 12. 15: P. 1. 16: V. 1. 5: A. 3. 9: C. 17.

H. formosum (Guenther I, p. 305)

Perca formosa, L. Syst. Nat. I. p. 488.

Labrus plumieri, Lacep. III, p. 480, pl. 2, fig. 2.

Hæmulon formosum, Cuv. & Val. V. p. 230; DeKay, New York Fauna, Fishes, p. 80, pl. 20, fig. 59.

Also lives in the salt-waters not remote from the Ocean, mouth of the Potomac River, &c.

ACAD. COLL.

H. CHRYSOPTERON.

The Yellow-finned Red-mouth.

In general shape like the Big Porgy. The body is elongated, much compressed, sharp and arched along the back, broader and nearly straight below. The very large head is long, compressed at the sides, narrower below, broad and flat between the eyes. When first taken from the waters, the whole animal is bright silvery, but it soon becomes of a pale burnt umber-brown, though the belly remains white. The posterior two-thirds of the lower jaw and mouth within and without are red.

Fin-rays:—D. 13. 14; P. 15; V. 1. 5; A. 3. 10; C. 18.

H. chrysopteron, Guenther, I, p. 313.

Perca chrysoptera, Linn. Syst. Nat. I, p. 488.

Lutjanus chrysopterus, Lacep. IV, pp. 186, 226.

Hæmulon chrysopteron, Cuv. & Val., V, p. 240, DeKay, New York Zool., IV, p. 85, pl. 7, fig. 22; Holbr. Ichth. S. Car., p. 121, pl. 17, fig. 1.

Occurs occasionally in the lower part of the Chesapeake Bay. It is not esteemed as food, its flesh lacking both firmness and flavor.

ORTHOPRISTIS, Girard.

O. FULVOMACULATUS.

The Hog Fish: The Speckled Red-mouth, or Grunts.

The form of this fish is elongated, compressed, thin and much arched at the back, thicker and nearly straight at the belly. The head is large, with a long and straight face, or but slightly incurved above the eye. Above pale brown; belly silvery; sides marked with numerous yellow spots, disposed in irregular oblique lines above the lateral line, and below it in horizontal rows. Lower jaw orange at the angle of the mouth.

Fin-rays:—D. 11. 15; P. 18; V. 1. 5; A. 3. 12; C. 17.

Labrus fulvo-maculatum, Mitch. Trans. Phil. Soc. New York, I, p. 406.

Hæmulon fulvo-maculatum, DeKay, New York Fauna, Fish, p. 84, pl. 7, fig. 2; Holbr. Ichthyol. S. Car. p. 157, pl. 22, fig. 2.

Pristipoma fulvo-maculatum, Guenther, 1, p. 301.

Occurs in the salt water of the lower part of Chesapeake Bay, and is much esteemed for food.

ACAD. COLL. S. 1

XXXI.—SERRANIDÆ.

CENTROPISTIS, Cuv.

C. ATRARIUS.

The Black Will, Black Fish, Black Perch, or Sea Bass.

The form is somewhat oblong, but when its capacious mouth and large gill-openings are extended, it appears nearly triangular. The very large head is more or less elevated, but descends rapidly towards the tail. Scales large. Very variable in color, but generally dusky-brown. Each scale has a dusky margin with a transparent spot in the middle, that allows the black skin to be seen under it.

Fin-rays:—D. 10. 11; P. 18; V. 1. 5; A. 3. 7; C. 17.

C. atrarius, Guenther 1, p. 86.

Perca atraria, L. Syst. Nat. 1, p. 485.

Coryphæna nigrescens, Bl. Schn., p. 297.

Perca varia, Mitchill Report, p. 10.

Lutjanus trilobus, Lacep, IV, p. 246.

Centropristis nigricans, Cuv. & Val., III, p. 37, pl. 44; DeKay, New York Fauna, Fish, p. 24, pl. 2, fig. 6.

— *rufus*, Cuv. & Val., IV, p. 47.

— *atrarius*, Holbr. Ichth. S. Car., p. 45, pl. 7, fig. 2

This is a well known fish to the market people, and is sometimes brought in considerable numbers during the Spring and Autumn. It never reaches a very large size, not exceeding 15 inches. It is very voracious, feeding alike on dead or living animal substances; and is in consequence easily taken with the hook.

It abounds on the coast of Worcester county, and in Sinepuxent Bay.

ACAD. COLL., S. 1

XXXII.—LABRACIDÆ.

ROCCUS, Gill.

R. LINEATUS.

The Striped Bass, or Rock-Fish.

The body is cylindrical, tapering, and moderately compressed. The head is large, long, thick, and very broad between the eyes; the snout very full and obliquely rounded. Bluish-brown or bluish above, silvery on the sides and beneath. Along each side are from seven to nine longitudinal lines of bluish-black color, which are occasionally indistinct or interrupted.

Fin-rays:—D. 9. 2. 12; P. 15—16; V. 1. 5; A. 3. 11; C. 17.

R. lineatus, Schœpff, Schriften der gesellsch. Naturforsch. Freunde, VIII p. 160.

Perca saxatilis, Bl. Schn. p. 89.

P. septentrionalis, Bl. Schn. p. 90, Taf. 20.

Sciæna lineata, Bl., Taf. 304.

Centropomus lineatus, Lacep. IV. 255.

Roccus striatus, Mitch. Report p. 25.

Perca mitchilli, Mitchill, Trans. New York, I p. 413, pl. 3 fig 4.

Labrax lineatus, Cuv. & Val. II p. 79; DeKay, New York Fauna, Fish., p. 7, pl. 1 fig. 3; Baird in Ninth Smithson. Report, p. 321; Holbr. Ichth. S. Car. p. 24, pl. 4, fig. 1.

This fish may occasionally be found in small shoals feeding on the barnacles and small crustacea around the piles of bridges and beneath scows and boats. They seem to prefer deep holes and basins in the channels of estuaries, in salt or brackish water. Many Rock-fish winter in the salt creeks, but the majority seek the deep sea-water.

In the late winter and early spring large specimens full of spawn are common in the Baltimore markets. The large specimens of this fish are known by the name of "Rollers."

ACAD. COLL.

MORONE. Gill.

M. AMERICANA.

The White Perch.

Body oval, much compressed; arched and thin along the back, less arched and slightly thicker at the belly. Head rather long, but not much elevated; eyes very large. Light bluish above, and paler beneath: sides and abdomen white: and without spots or marks, when just drawn from the water.

Fin-rays:—D. 9. 1. 12; P. 14; V. 1. 5; A. 3. 9; C. 17.

Perca americana, Gmel., Syst. Vol. 1, p. 1308.

Morone rufa, Mitchill, Report, p. 18.

Labrax mucronatus, Cuv. & Val. II p. 86, pl. 12; Baird in Ninth Smithson. Report p. 322.

— *rufus*, DeKay, New York Fauna, Fishes, p. 9, pl. 3 fig. 7; Guenther, I p. 65.

— *americanus*, Holbr. Ichth. S. Car. p. 21, pl. 3, fig. 2.

— *pallidus*, DeKay, l. c. p. 11, pl. 1, fig. 2.

The dark variety of this fish is called "Black Perch" on the western shore of Maryland. It inhabits the rivers and estuaries of the Chesapeake Bay in brackish waters, and sometimes swarms in such localities as the Potomac, south of Alexandria. It is much esteemed by the citizens of Baltimore, and is a favorite with certain anglers, who do not particularly value fly-fishing.

ACAD. COLL.

XXXIII.—PERCIDÆ.

PERCA, Artedi.

P. FLAVESCENS.

The American Yellow Perch.

Body elongated, moderately compressed, with the upper outline arched, and the lower nearly straight. The large head is flattened and the snout full and rounded. The eye is very large, more or less dusky above, tinted with greenish-yellow: sides, golden yellow: belly paler: chin flesh-colored. Six or eight vertical dusky bands, descending from the back on the sides disappear on the belly. Ventrals and anals bright orange; pectorals yellowish orange. Dorsals and caudal dusky brown.

Fin-rays:—D. 13. 1. 13; P. 15; V. 1. 5; A. 2. 8; C. 17.

P. flavescens Guenther I p. 59.

Bodianus flavescens, Mitch, Ph. Trans. New York, I p. 421.

Perca flavescens, Cuv. & Val. II p. 46; Richardson. Fauna Bor. Amer., Fishes, p. 1, pl. 74; Storer, Report, p. 5, and Synopsis, p. 17, and Boston Journal Nat. Hist. IV, p. 175; DeKay, New York Fauna, Fish, p. 3, pl. 1 fig. 1: Holbr., Ichth. S. Car. p. 2 pl. 1, fig. 1.

— *granulata*, Cuv. & Val. II p. 48, pl. 9, cop. by DeKay, New York Fauna, Fish, p. 5, pl. 68, fig. 220.

serrato-granulata, Cuv. & Val. II p. 47; DeKay, l. c., pl. 22, fig. 64.

The "American Yellow Perch" or Common Perch" is solitary in its habits, and even when very abundant is never seen in shoals. During the cold weather it is an inhabitant of the deep water, but in the summer it swims slowly against the current; it often stops very suddenly for a short time, in an almost perpendicular position, searching for food, and as suddenly darts forwards rapidly for a short distance, to repeat the same manœuvre. Notwithstanding its teeth are small, it is very voracious, and during July and August swims near the surface to catch insects. In November it is taken with rod and line south of the city of Baltimore. Having a white, firm and delicate flesh, it is brought in vast numbers to the city in spring and autumn, and commands a ready sale.

In the Chester, Patapsco and other rivers not remote from Baltimore, specimens of unusual size have occasionally been taken, weighing more than four pounds.

ACAD. COLL.

LUCIOPERCA, Cuv.

L. AMERICANA.

The Yellow Pike-Perch, or Jack.

Body elongated, cylindrical, tapering; profile of head in a gently sloping straight line to the end of the snout. Mouth wide, extensive; the lower jaw received into the upper. Yellowish-olive above the lateral line; lighter on the sides; silvery beneath. Head and gill-covers mottled with green, brownish and white.

Fin-rays:—D. 13. 1. 21; P. 15; V. 1. 5; A. 1. 14; C. 17$^{s}_{s}$.

L. americana, Valenciennes, I. p. 122, pl. 16; Kirtland, Zool. Ohio, p. 19, and Bost. Journ., IV. p. 237, pl. 9, fig. 2; Rich. Faun. Bor. Amer., Fishes, pp. 10 and 14; DeKay, New York Fauna, Fish., p. 17, pl. 50, fig. 163; Agas. Lake Super., p. 294.

Stizostedium americanum, Cope. Atlas of Md.

Scarcely if at all brought to the Baltimore markets, although it attains to a large size, and is highly prized for food in the mountainous regions, where it occurs. It is said to prefer the clear, cool, rapid waters of the higher levels.

MICROPTERUS, Gill.

M. SALMOIDES.

The Black Bass.

Elongated oval, arched; thick and rounded along the back; thinner and nearly straight at the belly. Head very large and thick, especially between the eyes; snout full and rounded: eyes very large. Head and body dusky above, with a greenish or bronzed tint: lower jaw and belly white; along the flanks runs a dusky band, more or less distinct according to the age of the fish: a bluish-black spot on the point of the opercle.

Fin-rays:—D. 9. 14; P. 14; V. 1. 5; A. 3. 12; C. 19.

M. salmoides, Gill, Proc. Ames. Assoc. 1873, p. 67.

Labrus salmoides, Lacep. IV. pp. 716, 717. pl. 5, fig. 2.

Grystes salmoides, DeKay, New York Fauna, Fishes, p. 26, pl. 69, fig. 223.

Introduced into the Potomac River from the Youghioghany; and now abounds in some of the upper parts of that stream, likewise in the Chesapeake and Ohio Canal, and has become naturalized in Lake Roland, near Baltimore.

It is greatly esteemed by the inhabitants of Montgomery, Frederick and Washington counties, who travel many miles to obtain a supply of it.

Acad. Coll. S. I.

CENTRARCHUS, Cuv.

C. HEXACANTHUS.

The Goggle-Eye, or Goggle-Eye Perch.

Nearly oval, much compressed, arched, thin both at the back and belly, the thickest part being just above the lateral line. The long, thin and elevated head is incurved above the eyes, and the snout is rounded, though narrow. The eye is very large. Head and body above more or less dusky, shaded with bluish-green: lower jaw, sides and belly silvery, marked with bluish-green blotches, more or less distinct, and placed without much regularity. The dorsal, anal and caudal fins with numerous yellowish spots.

Fin-rays:—D. 7. 15; P. 12: V. 1. 5: A. 6. 17: C. 17.

C. hexacanthus, Guenther, I. p. 257.

— *sparoides*, Cuv. & Val., III. p. 88, pl. 48.

— *hexacanthus*, Cuv. & Val., VII. p. 458; Kirtland, Bost. Journ., III. p. 480, pl. 29, fig. 2.

Cichla storeria, Kirtl. Rep. Zool. Ohio, p. 191.

Pomoxis hexacanthus, Holbr. Ichth. S. Car., p. 39, pl. 6, fig. 1.

Its precise locality in the State is uncertain, but probably in some of the streams emptying into the lower Potomac. Its food is said to be insects and small crustacea. Said to occur near the mouth of the Chester River, and sold in the Baltimore markets as "Strawberry Perch."

ACAD. COLL. S. I.

ENNEACENTRUS, Gill.

E. GLORIOSUS.

Sun-Fish.

Form oval, moderately compressed, the head somewhat scooped out above the eye, the muzzle rather short and blunt, the second-dorsal and the anal fins broad and rounded, the tail abruptly narrowed, slender; length of the head about one-third of that of the body including the tail-fin; the greatest height of body is about equal to one and a-half of the head. Colors brilliant, olive-greenish above, paler beneath, flecked, particularly above with bright gold-color, fins rosy, or even carmine, sometimes a little dusky, but marked all over with golden spots; often with a black spot on the back part of the gill-cover, placed a little above the tip, and with a small black spot next the base of the tail-fin. Length 2-2¾ inches.

Fin-rays: —D. 9. 11; P. 14; V. 1. 5; A. 3. 10; C. 17.

Bryttus gloriosus, Holbr., Journ. Acad. Nat. Sc. Philad. 1855. p. 51, pl. 5, fig. 1

The most beautiful of all our Sun-Fish. It is too small to serve as an article of food for man, but it is mercilessly seized by the voracious pike.

Inhabits some of the clear streams emptying into the lower Potomac, and abounds in spring-water coves, where the MYRIOPHYLLUM grows rankly.

Its rosy fins, flecked with gold, cause it to be greatly admired.

ACAD. COLL.

LIPOMIS, Cope.

L. AUREUS.

The Common Pond-Fish, or Freshwater Sun-Fish.

Body oval, compressed, convex above and below, but straighter and thicker at the belly. Head large, broad, smooth between the eyes and snout, which is full and rounded. Eyes large: mouth rather small, and very protractile. Head dusky above, with pale-blue waving lines running from the snout to the eye; sides of face also marked with five or six bands of similar color; appendix black, with a bright scarlet blotch behind. Body olive-brown above, marked with irregular reddish-brown spots: sides and belly yellow, more or less clouded, and with numerous brazen spots below the lateral line. Fins more or less tinged with yellowish-brown.

Fin-rays:--D. 10. 11; P. 13; V. 1. 5; A. 3. 10; C. 17.

P. aureus, L. Gm. p. 1286.

Pomotis vulgaris, Cuv. & Val. III, p. 91, pl. 49; Richards, Faun. Bor. Amer. p. 24, pl. 76; Kirtland in Bost. Journ. III, p. 470, pl. 28, fig. 2; DeKay, New York Fauna, Fish., p. 31, pl. 51, fig. 166; Holbr. Ichth. S. Car. p. 8, pl. 1, fig. 2.

Lipomis aureus, Cope. Atlas of Md. Zool.

In the region adjacent to Baltimore they prefer the brackish water, and are not found in the lower part of Chesapeake Bay.

It is considered by many a very sweet fish.

It prepares a place for depositing its spawn, usually in the high Eel-grass, or among the *Potamogetons*, where the bottom is sandy or of clay, sweeping it with the tail and excavating a shallow basin of from 1 to 2 feet in diameter, often selecting a spot, from which a small stick projects, to which it attaches its eggs. The mother-fish guards the eggs with great assiduity, defending them from all intruders, and remaining near until they are hatched.

Acad. Coll. S. I.

L. auritus, Linn.

The Black-Eared Pond-Fish.

Form a little longer, oval, compressed. Of a general rusty brown, in some specimens golden brown, strongly marked above the middle of the body by ferruginous spots; these spots are more sparse and distinct below the lateral line; body beneath and in front of the ventral fins blood-red; throat bluish-white. Two bluish-white undulating lines from head to tail. The long, broad appendix, rounded behind, is of a uniform black color.

Fin-rays:—D. 10 to 11, 9 to 11; P. 11 to 12; V. 1/5; A. 3, 9 to 10; C. 18.

P. appendix, Storer, Synops. p. 42.

This is the common Sun-Fish of our fresh water streams, sometimes attaining to a length of 6 inches.

It is eaten by the farmers of the interior of the State, and is always acceptable as an article of food.

Acad. Coll. S. I.

PILEOMA, DeKay.

P. semifasciata.

The Little Pickering.

Body oblong, cylindrical. Head small, sloping; eyes rather large; lower jaw shortest; gape moderate. The general color is pale greenish-olive, lighter towards the abdomen. The body is barred with black, transverse bands, extending from the back towards the sides; they are alternately longer and shorter, none are found on the lower third of the sides. A dark round spot at the base of the caudal; dorsals dark brownish; caudal fin with four or five vertical bands.

Fin-rays:—D. 13. 15; P. 15; V. 1. 5; A. 12; C. $15\frac{3}{3}$.

P. semifasciata, DeKay, New York Fauna, Fishes, p. 16, pl. 50, fig. 162.

—*zebra*, (*Etheostoma*), Agass. Lake Superior, p. 308, pl. 4, fig. 4.

Inhabits tributaries of the Potomac river South of Washington, and it occurs also in the Chesapeake and Ohio Canal. One specimen is in the Academy, which was caught in the Pamunkey Creek.

ACAD. COLL.

BOLEOSOMA, DeKay.

B. OLMSTEDI Agassiz.

The Tessellated Darter.

Body cylindrical, tapering, covered with rough scales, which are moderately large for the size of the fish. Head small: nape smooth, and depressed, as if strangulated. Eyes large, contiguous. The pointed pectorals and the small ventrals close together. The caudal fin, which is a powerful instrument, is even. Olive brown, with from five to seven oblong, squarish, black spots on the back along each side of the dorsal fin. Seven to nine similar spots along the lateral line; a short, vertical, black line from the eye obliquely forward, and a similar black dash from the eye to the nose; narrow bars on the rays.

Fin-rays:—D. 9. 14; P. 13; V. 1. 5; A. 10; C. $17\frac{5}{5}$.

Etheostoma olmstedi, Storer, Synopsis, p.

Boleosoma olmstedi, Agass, Lake Sup. p. 299.

B. tessellatum, DeKay, New York Fauna, Fish, p. 20, pl. 20. fig. 57.

Estrella atromaculata, Girard, Proc. Philad. Acad. 1859, p. 65.

This beautiful and graceful little fish inhabits the stony parts of our shallower streams. It is fond of settling on the flat rocks where the water is shallow, and darts with such rapid impulse as scarcely to be traceable by the eye. Being of such small size it is not used for food, but is preyed upon by the larger carnivorous fishes, which frequent similar places.

ACAD. COLL.

XXXIV.—LOBOTIDÆ.

LOBOTES, Cuv.

L. SURINAMENSIS.

The Black Triple-tail, Black Perch.

Form elliptical, elevated, compressed, a little thicker on the belly than along the margin of the back. Head short and compressed; snout rounded; profile incurved. When first taken from the water, this fish is light silver-grey, but it becomes soon darker, and finally almost black above; lower jaw, and cheeks near the eyes, are tinted with yellow, and a similar tint is occasionally seen along the back and shoulders. Dorsal, anal and ventral fins slightly tinted with yellowish.

Fin-rays:—D. 12. 16; P. 15; V. 1. 5; A. 3. 12; C. 17.

Holocentrus surinamensis, Bl. Taf. 243.

Bodianus triurus, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 428, pl. 3. fig. 10.

Lobotes surinamensis, Cuv. & Val. V. p. 319; DeKay, New York Faun. Fish, p. 88, pl. 18, fig. 49; Holbr, Ichth. S. Car. p. 169, pl. 24, fig. 2.

Occasionally caught in the lower part of the Chesapeake Bay.

XXXV.—POMATOMIDÆ.

POMATOMUS, Lac.

P. SALTATRIX.

The Tailor, or Blue-Fish.

Oblong, compressed, thicker above, and almost sharp below. Head rather large, thick, with the line of the profile slightly convex, and the snout rounded. When first taken from the water brilliant silver-colored, which soon becomes shaded with pale green along the back, finally darkening into a greenish-blue, especially in the old fish, and hence it is called "Blue-Fish." A dusky spot at the root of the pectoral fin.

Fin-rays:—D. 8.27; P. 16; V. 1.5; A. 2.28; C. 20.

Gasterosteus saltatrix, L. Syst. Nat. I, p. 49.

Scomber saltator, Bl. Sch. p. 35.

Pomatomus skib, Lacep. IV, p. 436, pl. 8, fig. 3.

Scomber plumbeus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 424, pl. 4, fig. 1.

Temnodon saltator, Cuv. & Val. IX, p. 225, pl. 260; DeKay, New York Fauna, Fish, p. 130, pl. 26, fig. 81; Baird, Ninth Smithson. Report, p. 337; Holbr. Ichth. S. Car. p. 64, pl. 9, fig. 2; Guenth. II, p. 479.

Exceedingly abundant in Chesapeake Bay: isolated specimens wander up as high as to the Susquehanna River.

"They have many of the habits of the Common Mackerel: collect in great multitudes, often swimming near the surface of the water, thus causing a thousand ripples, leaping at times a foot or more into the air, whence they are called 'Skip-Jacks.'"

Small specimens are common in summer in all the tide-water streams emptying into Chesapeake Bay.

ACAD. COLL. S. I.

XXXVI.—ELACATIDÆ.

ELACATE, Cuv.

E. CANADUS.

The Cobia, or Crab-Eater.

Elongated, nearly cylindrical, tapering gradually to the tail, and flattened above from the first dorsal spine to the snout, which gives it the appearance of the following fish. The large head is flat above, but full at the sides. The fresh fish is above dark olive-brown, which soon assumes a bluish-black color; cheeks and lower jaw silvery, faintly tinted with red; a broad, olive-brown band runs from the eye to the tail, and above and below this is a lighter tinted band; abdomen entirely white. All fins, except the white ventral fins, are olive-brown, and black at their bases. The soft dorsal fin is preceded by eight short, strong and compressed spines.

Fin-rays: 1 D. 8.2.30: P. 20: V. 1.5: A. 2.23: C. 21.

Gasterosteus canadus, L. Syst. Nat. p. 491.

Scomber niger, Bl. tab. 337.

Centronotus gardenii, Lacep. III, p. 357.

— *spinosus*, Mitch. Trans. Lit. & Phil. Soc. N. York, I, p. 490, pl. 3, fig 9.

Elacate atlantica, Cuv. & Val. VIII, p. 334, pl. 233: DeKay, New York Fauna, Fishes, p. 113, pl. 25, fig. 77.

— *canada*, Holbr. Ichth. S. Car. p. 97, pl. 14, fig. 2.

— *nigra*, Guenth. II, p. 375.

Found in the salt-water of the Southern part of Chesapeake Bay.

XXXVII.—ECHENEIDIDÆ.

LEPTECHENEIS, Gill.

L. NAUCRATES.

The White-Tailed Remora.

Body cylindrical, skin granular, and covered with slime. Head nearly one-sixth of the total length: flat above, with a broad disk, which is surrounded by an elevated border, and divided throughout its length by a fleshy partition, on each side of which are from twenty-one to twenty-three pairs of transverse plates. A fresh specimen is slate-brown above, lighter beneath. A broad black band extends from the angle of the mouth to the tail. Along the back are a series of dark colored marks, like an inverted letter V. Pectorals and ventrals edged with white: dorsal and caudal with a broad, white border, gradually diminishing towards the last rays. Tip of caudal broadly edged with white.

Fin-rays:—D. 33; P. 18; V. 7; A. 30; C. 18.

Echeneis naucrates, L. Syst. I. p. 446; Storer, Rep. Fishes, Massach. p. 153; Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 377.

— *albicauda*, Mitch. Am. Monthl. Mag. II, p. 244; DeKay, New York Fauna, Fishes, p. 307, pl. 54, fig. 177.

A solitary specimen of this ocean fish is occasionally met with in Chesapeake Bay.

Acad. Coll.

ECHENEIS, Artedi.

E. NAUCRATOIDES.

The Suck-Fish.

Similar in form to the preceding. Head large, broad, concave above, where it is occupied by the oval adhesive disk, the border of which is fleshy, thick, free, movable and elevated. It is divided by a partition, on each side of which are twenty-one transverse plates, with their free margins directed backwards. The body of a fresh specimen is dark above, with belly and lower jaw white; from the tip of the latter runs a stripe along the middle to the tail, interrupted only at the eye and pectoral fin; above this is a narrow band of clouded yellow, and below a sulphur-colored one. Dorsal, anal and ventral bluish, the former with the tips of the first six or seven rays white; caudal bluish, with the upper and lower margins white.

Fin-rays;—D. 37; P. 18; V. 1. 5; A. 33; C. 18.

E. naucratoides, *Gill*.

E. holbrookii, Guenther, II p. 382.

— *albicauda*, DeKay, New York Fauna, Fishes. p. 307.

lineata, Holbr. Ichth. S. Car. p. 102, pl. 14, fig. 1.

holbrookii, Guenther, Ann. & Mag. Nat. Hist. May, 1860, p. 400.

Rather uncommon in Maryland waters, but is sometimes met with in the southern part of Chesapeake Bay.

ACAD. COLL.

XXXVIII.—ATHERINIDÆ.

CHIROSTOMA, Sw.

C. NOTATA.

The Dotted Silverside, or Gudgeon.

Body elongated, cylindrical, compressed. Head of moderate size, somewhat flattened above, and one-fifth of the total length. Scales and eyes large; jaws very protractile. A broad silvery band from the gill covers to the tail. Color above this stripe sea-green; a dark, rounded spot at the base of the anal ray.

Fin-rays:—D. 9. 1. 19; P. 15; V. 1. 5; A. 1. 25; C. 19.

Atherina notata, Mitch. Lit. & Phil. Trans. New York, I p. 446, pl. 4 fig. 6; DeKay, New York Fauna, Fish, p. 141, pl, 28, fig. 88; Guenther, III p. 406.

This is the common Gudgeon, which runs from Chesapeake Bay into the fresh waters of our branches. In the Patapsco river it runs in May, and then affords fine sport to the anglers.

ACAD. COLL.

XXXIX.—MUGILIDÆ.

MUGIL, Artedi.

1. M. ALBULA.

The White Mullet.

Body almost cylindrical, tapering. Head moderate. Eyes covered with a thick skin. Scales on head and body large and rounded. Lips thin, finely pectinated, with membraneous slips. Of uniform white color, rather darker along the sides of the back, with a few dark-colored longitudinal stripes, which occur in many specimens. Caudal fin with a blackish border.

Fin-rays:—D. 4. 1. 8; P. 15: V. 1. 5; A. 1, 6; C. 15.

M. albula, L. Syst. I p. 520, from Catesb. South. Carol. II pl. 6; Mitch. Lit. & Phil. Trans. New York, I p. 447; Cuv. & Val. XI p. 94; DeKay, New York Fauna, Fishes, p. 146.

Brought to the Baltimore markets from the salt-water of the southern part of Chesapeake Bay. It enters the Bay, from the ocean, but nothing is reported as to its spawning in our region.

2. M. LINEATUS.

The Striped Mullet.

Body cylindrical; the outline of the back nearly as convex as that of the abdomen. Scales large, and easily detached. Head smaller than in most of the species; eyes large, with a thick skin. Purplish brown above; lighter on the sides, with ten or twelve dark brown longitudinal stripes, which disappear soon after death. Head with greenish metallic reflections; sides of the head yellowish. A dark purplish spot at the base of the pectoral fins; abdomen pearl-grey.

Fin-rays:—D. 4. 8; P. 16; V. 1. 5; A. 3. 8; C. $12\frac{4}{4}$.

M. lineatus, (Mitch.) Cuv. & Val., XI. p. 96; DeKay, New York Faun., Fish., p. 144, pl. 15, fig. 42.

Of rare occurrence in our markets, and no doubt brought from the salt waters of Chesapeake Bay.

S. I.

XL.—GASTEROSTEIDÆ.

APELTES, (DeKay,) Brev.

A. QUADRACUS.

The Four-Spined Stickle-Back.

Body fusiform, compressed, highest opposite the first dorsal spine; back arched; tail exceedingly slender. Head small. In front of the dorsal fin are three, and occasionally four movable spines, with a small membrane attached to each, all lying in a groove. Ventrals reduced to a single, stout, triangular spine, serrated on its front edge. Anal fin with a sharp, recurved spine. Olive-green, marbled with dusky above; whitish beneath.

Fin-rays:—D. 3 or 4. 1. 12; P. 12; V. 1; A. 1. 10; C. 13.

A. quadracus, Mitch. Trans. Lit. & Phil. Soc., I. p. 430, pl. 1, fig. 11 (bad); Cuv. & Val., III. p. 504; DeKay, New York Faun., Fish. pl. 6, fig. 18.

— *apeltes*, Cuv. & Val., IV. p. 505; Storer, Report, p. 31.

This fish runs in the Patapsco River some distance beyond tide, and no doubt seeks the inlets, where it may build its nest in the matted foliage of the Myriophyllum.

Its particular range has not yet been determined.

ACAD. COLL.

XLI.—BELONIDÆ.

BĔLŌNE, Cuv.

B. LONGIROSTRIS.

The Silver Gar, Banded Gar-Fish or Sea-Snipe.

Body much elongated; covered with small, transparent, roundish scales. Head and opercles trigonal, flat above. Upper mandible flattened at its base, rounded forward, terminating in an acute tip. Both mandibles furnished with long, conic, sharp, distant teeth, with smaller ones between. Upper part of body transparent sea-green. Side of head and body bright silvery, abdomen opaque white. A narrow green band runs from the opercle to the tail, separating the color of the back from that of the sides.

Fin-rays:—D. 16; P. 12; V. 6; A. 19; C. $19\frac{3}{3}$.

B. truncata, Lesueur, Journ. Acad. Nat. Sc., Philad., II. 1821, p. 126, with a plate; Storer, Report Massach. Fish, p. 98; DeKay, New York Fauna, Fish, p. 227, pl. 35, fig. 112; Cuv. & Val., XVIII. p. 422; Guenther VI. p. 244.

— *scrutator*, Girard, Proc. Ac. Nat. Sc., Philad., 1858, p. 170, and U. S. & Mex. Bound. Survey, Ichth. p. 30, pl. 13.

Esox longirostris, Mitch. Amer. Month. Mag., II. 1817, p. 322.

Common in all the brackish waters of Chesapeake Bay and its vicinity. It is brought to the markets, but seems not to be very highly esteemed.

ACAD. COLL. S. I.

XLII.—SCOMBERESOCIDÆ.

EXOCŒTUS, Artedi.

E. MESOGASTER.

The Flying Fish.

Elongated, almost cylindrical, flattened above, tapering towards the tail; head smooth, triangular. Scales thick and easily rubbed off; on each side of the body is a row of ridged ones, which extend from the lower edge of the gilt-covers to the tail. Eyes large, with a moderate depression between them, and three small pores on each side, and with channelled lines along the back. The dorsal fin commences over the ventrals; the pectorals with fifteen branched rays; the anal longer than high; the caudal deeply lunate, with its lower lobe much longer.

Color dark greenish, or bluish, above; beneath silvery white. Length 10—12 inches.

Fin-rays:—D. 14; P. 15; V. 6; A. 8.

E. mesogaster, Mitch. Trans. Lit. & Philos. Soc. N. Y., I. p. 448, pl. 5, fig. 3.

E. noveboracensis, DeKay, New York Fauna, p. 230.

Occurs at the mouth of the Potomac River, and in the southern part of Chesapeake Bay.

ACAD. COLL.

HEMIRHAMPHUS, Cuv.

H. ROBERTI.

Long and slender, head contained two and three-fourth times in the length af the body, excluding the tail-fin; lower jaw five and a-half times as long as the upper. Back dark greenish, sides with a well-defined silvery band.

Fin-rays:—D. 15; P. 13; V. 6; A. 16; C. 18.

H. roberti, Cuv. & Val. XIX, p. 24; Guenther, Cat. British Museum, vol. VI, p. 263.

Obtained on the bay side of St. Mary's county in August. It swims in shoals, and seems to be common in that region.

ACAD. COLL.

SCOMEBRESOX, Lacep.

S. SCUTELLATUS.

The Northern Bill-Fish.

Body elongated, compressed, gradually lessening in depth back of the anus. Head, including the jaws, equal to one-fourth the length of body; gill-covers large, smooth; the lower jaw the longer. Structure of jaws as in the *Gar-Fish.* Belly with a keel-like edge. The posterior portions of the dorsal and anal fins are divided, forming finlets, as in the *Mackerel.* From the lower edge of the opercle, extending to the fourth anal finlet, forming the lateral boundaries of the abdomen, are two yellowish lines, formed by a continued series of scales. Back olive-green; beneath it a strongly-marked silvery band, half an inch wide, divided in its centre by a narrow line of the same color as the back: abdomen and gill-covers satiny. Dorsal fin and its finlets greenish; a dark green spot at base of the pecorals, above.

Fin-rays:—D. 10. V or VI; P. 14; V. 6; A. 12. V or VI; C. 20.

S. scutellatum, Lesueur, Journ. Acad. Nat. Sc. Philad. II, 1821, p. 132.

— *scutellatus*, Cuv. & Val. XVIII, p. 477.

Met with, but only very rarely, near the entrance to Chesapeake Bay.

XLIII.—ESOCIDÆ.

ESOX, (Artedi) Cuv.

1. E. UMBROSUS.

Body somewhat cylindrical; the outline of the back moderately straight. Head contained four times in the total length.

Color more or less dull leaden, faintly, if at all, banded. Operculum and cheeks entirely covered with scales.

Fin-rays: -D. 13: V. 12: A. 12.

E. umbrosus, Kirtland, Cleveland Annals Science, 1854, p. 79: Cope. Proceed. Acad. N. S. Philad. 1865, p. 79.

The only known locality for this fish within the limits of the State of Maryland, is the Susquehanna River, on the boundary of Harford county. How far it contributes to the food of the inhabitants of that region has not yet been reported, no doubt it shares with the Fall-fish in adding to the viands of the table. It is smaller than the common Pike of the Baltimore markets.

S. I.

2. E. RETICULATUS.

The Pike. The Common Pickerel.

Body nearly cylindrical, elongate: much flattened upon the back; scales small; snout blunt; upper jaw smooth, broad, depressed, shorter than the lower jaw. The color of this pike varies in intensity and tint. In some it is deep green, varying to blackish on the back and head, or bluish grey; in others it is of a golden or olive-yellow on the sides, the free margins of the scales bordered with black. Numerous, irregular, abbreviated, longitudinal, dusky streaks on the sides of the body, united with similar oblique streaks produce the imperfectly reticulated appearance. Dorsal fin nearly square, slightly rounded above: the last ray, much the shortest.

Fin-rays: - D. 18: P. 13: V. 10: A. 17: C. 19.

E. reticulatus. Lesueur, Journ. Acad. Nat. Sc. Phil. I. 1818, p. 414: Storer. Report Fish. Massach, p. 97: Kirtland, Zool. Ohio, p. 194; DeKay, New York Faun. Fish, p. 223, pl. 34, fig. 107; Cope. Proc. Acad. Nat. Sc. Philad. 1865, p. 19.

Esox lucius, Var., Mitch. Lit. & Phil. Trans. New York. I, p. 440.

Widely distributed in the quiet and grassy tributaries of the tide-water region of both shores. Much esteemed, particularly by the farmers of the more central counties. Sold in the towns of Worcester county by hucksters, who transport them in light wagons from place to place. The placid creeks of the marshes bordering and connecting with Sinepuxent and Newport Bays, where the *Nymphæa odorata* and *Brasenia peltata* grow luxuriantly, are the favorite haunts of these fish, and there they may be seen basking at the surface in the full sun-blaze of a summer's day.

ACAD. COLL. S. I.

3. E. NIGER.

The Varied Pickerel.

Body cylindrical, with its upper surface much flattened. Upper part of head with a deep, longitudinal groove. Dorsal fin higher than long, its margin much rounded. Dark brownish-black above, descending in irregular dark clouds a short distance on the sides. Sides greenish-yellow, with irregular vertical, brown stripes descending on the belly. Dorsal and caudal fins dark brown: a short dark band from the eye to the angle of the jaw.

Fin-rays: D. 15: P. 15: V. 9: A. 14: C. 19⅔.

E. niger, Guenther, VI. p. 229.

Esox scomberius, Mitchill.

—*niger*, Lesueur, Journ. Ac. Nat. Sc. Philad. I. p. 415.

—*americanus*, Cuv. & Val. XVIII. p. 329.

—*fasciatus*, DeKay, New York Faun. Fish, p. 224, pl. 34, fig. 110; Cope. Proc. Acad. Nat. Sc, Phil. 1865, p. 79.

In Maryland, probably confined to the Eastern Shore. Specimens scarcely, if at all, now reach the Baltimore markets.

XLIV.—UMBRIDÆ.

UMBRA, Kramer.

U. LIMI.

Has the shape of *F. viridescens.* Back nearly straight, flat, and slightly depressed in front of dorsal fin. Head flattened above, slightly descending to the pointed snout. Scales large. Eyes large, near the snout; mouth small. Olive-brown, with numerous transverse bars across the body and tail; a distinct black line in the course of the lateral line; across the tail is a broad, black bar; fins light olive-brown. The dorsal fin of fifteen rays is placed far back, and has the third ray longest.

Fin-rays:—D. 15; P. 15; V. 6; A. 10; C. 12.

U. limi, Guenther, VI. p. 232.

Hydrargyra limi, Kirtl. Bost. Journ. Nat. Hist. III. p. 277, pl. 2, fig. 4.

— *atricauda*, DeKay, New York Fauna. Fishes, p. 220.

— *fusca*, Thompson, Nat. Hist. Vermont, p. 137.

Fundulus fuscus, Ayres, Boston Journ. Nat. Hist. IV. p. 206, pl. 13, fig. 2.

Common in the Patapsco region where the water is brackish and where small creeks empty into the estuaries.

ACAD. COLL.

XLV.—CYPRINODONTIDÆ.

FUNDUDUS, Lacep.

F. VIRIDESCENS.

The Mud-Dabbler. Big Killie, or Minnow.

Body elongated, cylindrical, flattened above, much compressed on the sides of the tail. Scales large; very large on the head, extending to the end of the snout; a central one on the summit of the head, with its entire margin free. Head very small, flattened above, with large and distant eyes. Olive-green above, lighter on the sides: whitish, tinged with yellowish, on the abdomen.

Fin-rays:—D. 11; P. 17; V. 6; A. 11; C. 29.

F. viridescens, Schœpff, Beobach. der Naturf. etc., vol. VIII, p. 172; Nat. Hist. of New York, p. 217, pl. 31, fig. 99.

Hydrargyra pisculenta, Mitchill. Storer's; Syn. of the fishes of N. A. in Mem. Am. Acad. of Arts and Sciences, vol. II, p. 432.

Common in the brackish waters of the Western Shore on the Bay side. In the regions of the Patapsco, they live in shallow waters, where small creeks and branches empty into the estuaries. Their habits are carnivorous, and they find welcome food in the beach-fleas, which abound in such places.

ACAD. COLL.

2. F. FASCIATUS.

The Mud-Dabbler, Striped Killie-fish, or May-fish.

Body oblong, somewhat compressed. Head depressed. Dusky greenish on the back; darker on the head above. Sides brassy-yellow, tinged with green; lighter beneath. Along the sides are faint indications of dusky bars, which become on the tail distinctly marked black bars, or lines of interrupted black dots. Besides these bars there are also from two to five irregular, longitudinal stripes of various lengths. Dorsal and anal with numerous white dots.

Fin-rays:—D. 14; P. 15; V. 6; A. 11; C. 23.

F. fasciatus, Schœpf, Beobach. Ntfr. Fr., vol. VIII, p. 173; Nat. Hist. of New York, p. 216, pl. 32, fig. 98.

Hydrargyra fasciata, Schn.; Storer's Synops. of the Fishes of N. A. in Mem. of the Am. Acad. of Art and Sciences, vol. II, p. 432.

This fish is abundant in the tide-water of creeks, emptying into the Patapsco and Magothy rivers: it is very variable in its markings, the stripes being often obsolete and only indicated by dots or short lines.

Acad. Coll.

3. F. heteroclitus.

Mud-Dabbler.

The height of the body equals the length of the head, and is contained thrice and two-thirds in the total length (without caudal); males have the body comparatively shorter. Coloration uniform (in spirits.)

Fin-rays:—D. 11: P. 17: V. 6: A. 11: C. 19;.

F. heteroclitus, Guenther, VI, p. 318.

Cobitis heteroclyta, L. Syst. Nat. I, p. 500.

Patapsco River, particularly around the shores of the coves in the vicinity of Salt-marshes.

Acad. Coll.

4. F. pisculentus.

Mummichog, or Ornamented Minnow.

Body oblong, stout, compressed behind. Top of head and back flattened. Head one-fourth of the length of fish. Female of a uniform brown color. Male, lighter at intervals upon the sides, presenting the appearance of transverse bands. Dorsal and anal fins with black dots.

Fin-rays:—D. 12; P. 15; V. 6; A. 9—10; C. 20.

F. pisculentus, Guenther, VI, p. 324.

Esox pisculentus, Mitch. Lit. & Phil. Trans. New York, I, p. 441.

Fundulus pisculentus, Cuv. & Val., XVIII, p. 190; Storer, Mem. Am. Ac., V, p. 294, pl. 23, figs. 3 and 4.

Abundant in the Patapsco River, and swims in small shoals near the shores in muddy coves at the mouths of creeks. It is an excellent bait for other fishes.

Acad. Coll.

6. F. MULTIFASCIATUS.

Mud-Dabbler, or Mummichog.

Body cylindrical, more compressed behind. Head broad and flattened; its length is greater than the greatest depth of the fish, and less than one-third its entire length. Caudal fin broad, nearly straight at its termination. Olive above; sides lighter; lower portion of opercles silvery; throat and back portion of abdomen bluish-grey. The body is transversely marked with numerous bluish bands, (about fifteen) and dotted with darker minute points.

Fin-rays.—D. 13—14: P. 18: V. 5: A. 12—13: C. 16.

F. multifasciatus, Guenther, III, p. 324.

Hydrargyra multifasciatus, Lesueur. Journ. Ac. Nat. Sc. Philad. I. 1817, p. 131.

Fundulus multifasciatus, Cuv. & Val. XVIII, p. 200; Cope, Proc. Acad. Nat. Sc. Philad. 1865, p. 78.

Was formerly very common in the region of black marsh around the Patapsco River. The chemical manufacturies having polluted the waters, many of these fish have died out, and their extermination seems imminent.

ACAD. COLL.

HYDRARGYRA, Lac.

H. MAJALIS.

The Bull-Minnow, or Striped Killifish.

Body elongated, slightly convex on the dorsum over the pectorals in the female, nearly straight in the male. Greatest depth of the body, which is across the pectorals, less than the length of the head; the latter, which is equal in length to one-fourth of the entire length of the fish, is compressed above. Female yellowish-green above, lighter upon the sides, white beneath; several longitudinal, interrupted, black bands (sometimes five, sometimes not more than one or two), extend from the gill-covers to the tail. At base of tail three or more less distinct transverse bands. Male with greenish-black sides and back; sides crossed by numerous, slate-colored, nearly black, transverse bands. Lower portion of sides, and abdomen, yellowish-green. Dorsal fin with a black roundish spot, before which—in larger specimens—are three or four broken, dark-colored blotches. The orange-colored caudal fin is margined with black.

Fin-rays:—D. 14—16; P. 16—18; V. 6; A. 11—12; C. 18—20.

Esox flavulus, Mitch. Lit. & Phil. Trans. New York, I, p. 439, pl. 4, fig. 8.

Cyprinodon flavulus, Valenc. in Humb. Obs. Zool. I, p. 164, pl. 32, figs. 3, 6 & 7.

Hydrargyra trifasciata, Storer. Journ. Soc. Nat. Hist. Boston, I, 1837, p. 417.

— *flavula*, Storer, Mem. Amer. Ac. V, pl. 25, figs. 5 & 6; Baird, Ninth Smithson. Report, 1855, p. 344.

Hydrargyra majalis, Cuv. & Val. XVIII, p. 207.

Fundulus majalis, Guenther, VI, p. 322.

This beautiful and large species inhabits the Patuxent and Potomac Rivers, and perhaps other parts of the tide-waters of the western shore, south of the Patapsco. As yet, it has not been reported from the latter river.

ACAD. COLL.

XLVI.—PERCOPSIDÆ.

PERCOPSIS, Agassiz.

P. GUTTATUS.

This fish, shaped like a young Salmon, is of small size and slender form, though the back is very much elevated. Sides compressed, gradually diminishing in thickness from the front backwards. Ground color yellow, much darker above the lateral line than below. On the back are blackish-brown spots, sometimes disposed in two or three longitudinal rows, wishout great regularity. Along the middle of the body is a silvery ridge. A small adipose fin is situated at about equal distance between the end of dorsal and base of the caudal.

Fin-rays:—D. 2. 10; P. 12; V. 8; A. 1. 7; C. 26^{8}_{6}.

P. guttatus, Agass. Lake Super. p. 286, pl. 1, fig. 1—2.
— *pellucida*, (Salmoperca), Thompson, Proc. Bost. Soc. Nat. Hist. III, 1851, pp. 164, 306.

Inhabits the lower Potomac River, and is often mistaken for a young Salmon. Prof. Baird has seen specimens from the Susquehanna River.

S. I

XLVII.—SYNODONTIDÆ.

SYNODUS, (Gron.) Bl. Schn.

S. FŒTENS.

The Providence Whiting.

Body elongated, though tolerably stout; nearly round, or a little depressed. Head broad, and triangular, if seen from above, with the snout pointed. Mouth very large; lower jaw shorter than the upper, and when the mouth is shut, leaving the teeth of the upper exposed. Back and sides above mottled reddish or olive-brown, varying much in tint; sides below lateral line paler; belly faint yellow.

Fin-rays:—D. 11; P. 18; V. 1. 5; A. 10; C. 21.

S. fœtens, Catesby, South Carolina, II, p. 2, tab. 2, fig. 2.

Salmo fœtens, L. Syst. Nat. 1, p. 513.

Coregonus ruber, Lacep., V, pp. 244, 263.

Saurus fœtens, Cuv. & Val., XXII, p. 471; Holbr. Ichth. S. Car., p. 187, pl. 26, fig. 1.

Occurs in the tide water part of the Potomac River, and along both shores of the Southern end of the Eastern Shore.

ACAD. COLL.

XLVIII.—SALMONIDÆ.

SALMO, Artedi.

S. FONTINALIS.

The Brook-Trout, or Red-Spotted Trout.

Body elongated, compressed. Length of flattened head equal to about one-fifth of the whole length of fish; snout obtuse. Scales very small. Adipose fin quite small, and near the tail. Upper part of the body pale-brown, mottled with darker, undulating, reticulated markings; sides lighter, with numerous, round, yellow spots, varying in size from a small point to a line or more in diameter, and many with a bright red spot in the centre. Very variable, as almost every locality has its peculiar colored Trouts. Body beneath white. Some of the fins are often mottled with black spots.

Fin-rays:—D. 11; P. 13; V. 8; A. 11; C. 19.

S. fontinalis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 435; Richards Fauna Bor. Amer. III, p. 176, pl. 83, fig. 1 and pl. 87, fig. 2; Storer, Report Fish. Massach., p. 106; DeKay, Fauna New York, Fish, p. 235, pl. 38, fig. 120.

Baione fontinalis, DeKay, l. c. p. 244, pl. 20, fig. 58.

Salmo erythrogaster, DeKay, l. c. p. 236, pl. 39, fig. 126.

This is the "Brook Trout," of our clear streams, particularly in the mountainous regions of the State. Of late years it has been exterminated in most of the streams near Baltimore.

ACAD. COLL.

XLIX.—HYODONTIDÆ.

HYODON. Lesueur.

H. TERGISUS.

The Mud Shad: The River Moon-eye.

Body compressed, back very slightly arched. Scales large, ascending high up on the base of the caudal. Head small; eyes very large, nearly filling up the whole space between the angle of the jaws, and the upper part of the head. Back bluish: sides silvery. Fins tinged with yellow; base of caudal rays dusky.

Fin-rays:—D. 15; P. 15; V. 7; A. 29; C. 18$\frac{1}{1}$.

H. tergisus, Lesueur, Journ. Ac. Nat. Sc. Philad. I p. 336; Kirtland, Rep. Zool. Ohio, p. 170, 195, and Bost. Journ. Nat. Hist. V. 1846, p. 338: DeKay. New York Fauna, Fish, p. 265. pl. 41. fig. 130: Cuv. & Val. XIX, p. 309, pl. 572: Girard, U. S. Pac. R. R, Exped., Fish, p. 332 pl. 75, fig. 1—4.

Occurs in the canal in Washington county. It seems to be little esteemed for food: being considered bony and unsavory. Seéms to be frequently confounded with the Hickory-Shad of our tide-water districts.

ACAD. COLL.

L.—ELOPIDÆ.

ELOPS. Linn.

E. SAURUS.

The Big-eyed Herring, or Jackmariddle.

Form much elongated, nearly cylindrical, round on the back, slightly flattened on the belly, and a little compressed on the sides, but more so near the tail. Head long and thick, with a full and round muzzle. Eyes very large; mouth wide, extending behind the orbit of the eye. The lower jaw seems longer than the upper, but it is in fact let into it when the mouth is closed. The head is pale green above, white on the sides; the body is pale silver-gray above, or with a faint greenish tint, and silvery on the sides and belly.

Fin-rays:—D. 24; P. 18; V. 1. 5; A. 17; C. 28.

E. saurus, L. Syst. Nat. 1, p. 518; Bloch, Taf. 393, fig. 1; DeKay, New York Fauna, Fish. p. 267, pl. 41, fig. 131; Cuv. and Val. XIX, p. 365.

— *inermis*, Mitchill, Lit. & Phil. Trans. New York, I p. 445.

Enters our large rivers from the salt waters of Chesapeake Bay, but seems to be quite uncommon. Specimens have been taken in the St. Mary's River. One from Tangier Sound measured 20 inches in length.

ACAD. COLL.

LI.—DUSSUMIERIDÆ.

ETRUMEUS, Bleek.

E. TERES.

The Round Herring.

Body elongated, cylindrical. Length of head to the total length as one to five (nearly). Scales, large, round, ascending on the caudal fin. Head long and pointed, with a deep furrow on the summit. Eyes and mouth large, the latter protractile. Bright silvery; darker above, with a tinge of blue and yellow on the flanks; sides of the head metallic silvery, mixed with cupreus. Dorsal and caudal tinged with yellow; the remaining fins transparent, feebly punctated with black.

Fin-rays:—D. 19; P. 15; V. 10; A. 12; C. 19^{6}_{6}.

E. teres, Guenther VII, p. 467.

Alosa teres, DeKay, New York Fauna, Fish, p. 262, pl. 40, fig. 128; Baird, Ninth Rep. Smithson. Inst. 1855, p. 349.

Dussumieria teres, (Brevoost) Gill, Proc. Acad. Nat. Sc. Philad. 1860, p. 21.

Harengula teres, Girard, Proc. Acad. Nat. Sc. Philad. 1859, page 158,

Ocean coast of Worcester county. Seems to be uncommon, but is said to have been brought to the markets of Baltimore.

LII.—CLUPEIDÆ.

BREVOORTIA, Gill.

B. MENHADEN.

The Ale-Wife, or Menhaden.

Body elongated, compressed. Its depth across, at the base of the pectorals, less than one-fifth the length of the fish: length of the head more than one-third the length of it. Gill covers very large: eyes round and moderately in size: gape of mouth very large. Upper part of body greenish-brown, darker upon the top of the head and at the snout: upper part of the sides in the living fish rose-colored, and mottled with blue, which disappear in death; abdomen silvery: a black spot, more or less distinct, upon the shoulders: whole surface of the fish iridescent.

Fin-rays: D. 19: P. 15-17: V. 6: A. 18-22: C. 20.

B. menhaden,, Mitch. Lit. & Phil. Trans. New York, I. p. 453, pl. 5, fig. 7.

Alosa menhaden, Storer, Report Fish. Massach. p. 117; De-Kay, New York Faun., Fish. p. 259, pl. 21, fig. 60; Ayres. Bost. Journ. Nat. Hist. IV. p. 275; Storer, Mem. Am. Ac. VI. p. 337, pl. 26, fig. 3.

Brevoortia menhaden, Gill, Proc. Ac. Nat. Sc. Philad. 1861, p. 37.

Common on the Atlantic coast of Worcester county and even entering Sinepuxent Bay, also in vast shoals in Chesapeake Bay, particularly about the mouths of the great rivers of both peninsulas. They have been extensively used for manure by the farmers living near the coast, where they are caught by untold thousands in the large seines.

ACAD. COLL. S. I.

ALOSA Cuv.

A. SAPIDISSIMA.

The American Shad.

Body oblong, compressed. Head equal in length to one-sixth of the entire fish; the greatest depth of the body exceeds the length of the head. Covered throughout with large, deciduous scales, with the exception of the head, which is naked. The upper jaw with a deep notch in the centre. Upper portion of the sides cupreous: lower portion silvery, with a greenish tinge; abdomen pearly: top of head and back bluish. A black blotch of considerable size at the hind angle of the operculum.

Fin-rays:—D. 17—19; P. 16; V. 9; A. 20—22; C. 20.

Two young specimens were caught May 7th, by Major T. B. Ferguson, near the mouth of Elk River. The measurements were as follows,—Total length to tip of caudal fin 5 inches; greatest width $1\frac{1}{8}$ inches; length of head $1\frac{1}{4}$ inches. Head contained $3\frac{2}{3}$ times in the length of the body excluding caudal fin. Color silvery, back olive.

Clupea sapidissima, Wilson, in Rees' New Cyclopædia, 1st Amer. Ed. Art. *Clupea*.

Alosa sapidissima, Storer, Synops. p. 458, No. 1.

This is the American Shad so highly prized by Marylander's of the tide-water districts. It is the most savory of all our fishes, and was formerly common in all the rivers emptying into the Chesapeake Bay on the Western shore, and in the principal ones of the Eastern shore.

The principal fisheries of it are now in the Susquehanna, Potomac and Chester Rivers, although smaller numbers are taken in the Patuxent and Severn. It has been almost cleared out of the Patapsco River, although a few stragglers venture up to get beyond tide during almost every spring. There are several "runs" of this fine fish in the lower Potomac River, which follow each other at intervals of a few days.

Acad. Coll. S. I.

OPISTHONEMA, Gill.

O. THRISSA.

The Shad-Herring, or Thread-Herring.

Body compressed, elliptical. The height of the body is one-third of the total length (without caudal,) the length of the head rather less than one-fourth. Lower jaws but slightly prominent. Abdomen with fourteen projections like saw-teeth. Bluish above, with an indistinct bluish spot on the shoulder; each scale on the back with a dark spot, the spots forming longitudinal series. Last dorsal ray produced into a long filament.

Fin-rays:—D. 19; P. 18; V. 8; A. 23--24; C. 19.

O. thrissa, Osbeck, Reise p. 336.

Meletta thrissa, Cuv. & Val., XX. p. 380.

Chatoessus signifer, DeKay, New York Faun., Fish. p. 264, pl. 41, fig. 132.

Opisthonema thrissa, Gill, Proc. Ac. Nat. Sc. Philad. 1861, p. 37.

Enters the tributaries of Chesapeake Bay in the salt waters, but is never abundant. Occurs annually along the coast in September. Have been brought to the markets of Baltimore, but not in large numbers.

Acad. Coll. S. I.

POMOLOBUS, Gill.

P. PSEUDOHARENGUS.

The Herring; Ale-Wife of farther North.

Form elliptical, a little thickened along the back; the curve of the dorsal outline a little less than that of the ventral; belly compressed; slope behind the dorsal fin very gradual:

greatest breadth just in front of the dorsal fin and which is about equal to one and a-half lengths of head: head contained about six times in the length to tip of tail-fin; caudal fin deeply emarginated. Color of back steel-bluish, or greenish; the head above and tip of lower jaw of the same color; sides and belly silvery, the former with from four to six dusky lines.

Fin-rays:—D. 4. 13; P. 1. 4. V. 1. 8; A. 18; C. 21.

P. pseudoharengus, Wilson, in Rees' New Cyclopædia, 1st Amer. Ed. IX, Art. *Clupea.*

Alosa. tyrannus, DeKay, New York Fauna, p. 258, pl. 13, fig. 38.

This is the "Glut Herring" of the Potomac River, so called from the vast shoals which crowd that river during the spawning season, in May.

It deposits its eggs on the bottom of the river, seeking localities, where the water is fresh, and apparently preferring the hard beds where the *myriophyllum* grows, and no doubt where the water is well ærated. A form which we can hardly regard as a distinct species, deposits its eggs in the small branches in the same region, and thence takes the name of "Branch Herring."

At the mouth of the Susquehanna River, and at Chesapeake City on the Elk River, as well as in the Chester River it gives rise to important fisheries, which were formerly a great source of revenue to the inhabitants. The "Maryland Red Herring" was once a well known and highly esteemed article here and in many of the States north of Maryland, but this institution has died out by reason of the changes, which have taken place in the habits of our people.

ACAD. COLL. S. I.

POMOLOBUS, (Raf.) Gill.

P. MEDIOCRIS.

The Autumnal Herring, or Tailor Shad.

Body elongated, compressed. Head equal in length to about one-fifth the entire fish; the lower jaw is the longer;

chin prominent, eyes large; abdomen serrated; scales large and rounded. The sides of the fish are silvery, with six or eight indistinct, bluish bands running from the head to the tail, which are light-colored after death. Pectoral and caudal fins dark-brown: anal and ventral fins nearly white.

Fin-rays:—D. 17; P. 16; V. 8; A. 20; C. 20.

C. mattowocca, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 451, pl. 5, fig. 8.

Clupea mediocris, Mitch. l. c.

Alosa mattowocca, DeKay, New York Fauna, Fishes, p. 260, pl. 11, fig. 127: Ayres, Bost. Journ. Nat. Hist. IV.

— *tyrannus*, DeKay, l. c. p. 258, pl. 13. fig. 38.

— *lineata*, Storer, Proc. Bost. Soc. Nat. Hist. II, p. 242. and Mem. Amer. Ac. VI, p. 340, pl. 27. fig. 2.

Caught in the Potomac River in the large seines, when being hauled in the Spring for the Shad.

It attains a length almost equal to the Shad, but is of a more slender form. As an article of food it is not popular with the fishermen of the Potomac.

Acad. Coll. S. I.

LIII.—DOROSOMIDÆ.

DOROSOMA, (RAF.) GILL.

D. cepedianum.

The Toothed Herring, The Old Wife.

Height of body contained twice and three-fifths in the total length; length of head four times. Back much arched. Oval, compressed. Head small: eyes of medium size: snout slightly projecting beyond the mouth. Belly serrated; scales large. The last ray of dorsal fin much elongated. Dusky above, sides and abdomen white: many specimens with a dark spot on the shoulders.

Fin-rays:—D. 12: P. 16; V. 8; A. 33: C. 19.

Megalops cepediana, Lesueur, Ac. Nat. Sc. Phila., I, 1817, p. 361.

Chatœssus cepedianus, Cuv. & Val., XXI, p. 72, pl. 612.

— *ellipticus*, Kirtl. Rep. Zool. Ohio, pp. 169, 195; Boston Journ. Nat. Hist. IV, p. 235, pl. 10, fig. 1.

— *insociabilis*, Abbott, Proc. Ac. Nat. Sc. Phila., 1860, p. 365.

— *cepedianus*, Guenther, VII, p. 409.

Generally preceding the shad; but little valued. When imprisoned by freshets in inland streams, they thrive well.

They were formerly seen in large shoals in the Baltimore docks, but recently they have failed to appear there.

They occur in the Potomac, Patapsco and other rivers of both peninsulas.

ACAD. COLL. S. 1.

LIV.—ENGRAULIDÆ.

ENGRAULIS, Lacep.

E. VITTATUS.

The Gudgeon, or Anchovy.

Elongated, elyptical, compressed. Head elongated, sharp wedge-shaped, broad above. Eyes large; jaws unequal, the upper much longer, into which the lower jaw shuts as into a groove. Scales very large. Caudal fin deeply forked. Top of head bluish-slate; back light green, dotted with brownish; a greenish-blue stripe high up on the side, extending from the eye to the tail; sides below greenish-silvery, with metallic reflections. Gill-covers and abdomen silvery.

Fin-rays:—D. 8; P. 17; V. 5; A. 14; C. 18.

Clupea vittata, Mitchill, Trans. Lit. & Phil. Soc. New York, I, p. 456; DeKay, New York Fauna Fishes, p. 254.

Engraulis mitchilli, Cuv. & Val. XXI, p. 50; Guenther, VII, p. 391.

Runs from the salt water into our creeks and branches in April - May to spawn, and is then taken by the hook in large numbers. It is a savory little fish, and highly popular with Baltimore anglers.

ACAD. COLL.

LV.—CYPRINIDÆ.

CATOSTOMUS, Lesueur.

1. C. COMMUNIS.

The Mud Sucker.

Body cylindrical, broad and rounded above the origin of the dorsal fin, and compressed towards the tail. Head smooth, scaleless; caudal fin almost furcate. Scales small on the anterior part of body, increasing in size towards the tail. Head dark green, nearly black; cheeks bronze and golden; body above purplish, with pink and metallic tints on the sides; beneath white.

Fin-rays:—D. 13—14; P. 16—18; V. 10; A. 8—9; C. 17—$18\frac{4}{4}$.

Catostomis communis, Lesueur, Journ. Ac. Nat. Sc. Phila. I, p. 1817, p. 95; DeKay, New York Fauna, Fishes, p. 196, pl. 33, fig. 106.

Common in most of our small streams away from brackish water. The rank taste of the flesh renders it distasteful to many persons, but in the interior sections of the Western shore it is generally eaten by the people.

In early Summer these fish build their nests of piles of sand and stones, and shortly afterwards their dead bodies may sometimes be found in dozens along the shores of streams such as Gwynn's Falls.

ACAD. COLL.

2. C. NIGRICANS.

The Black, or Mud Sucker.

Similar in shape to the preceding. Head large and square. Black above: reddish yellow on the sides, with black blotches: beneath white. Dorsal fin black, the other fins reddish.

Fin-rays:—D. 11; P. 18; V. 9; A. 8; C. 18.

C. nigricans, Lesueur, Journ. Ac. Nat. Sc., I. 1817, p. 102; Kirtland, Boston Journ. Nat. Hist., V. p. 273, pl. 21, fig. 3.

Found in the Youghioghany River, in the mountains of Maryland.

S. I.

3. C. DUQUESNII.

The Red Horse, or Pittsburg Sucker.

The height of the body is nearly equal to the length of the head, which is one-fourth of the total (without caudal). The strong scales are of nearly the same size over the entire body. Back and forehead dusky-olive and coppery; sides coppery; abdomen white.

Fin-rays:—D. 14; P. 17; V. 10; A. 9; C. 18.

C. duquesnii,, Lesueur, Journ. Ac. Nat. Sc., Philad., I. p. 105; Kirtland, Boston Journ. Nat. Hist., V. p. 268, pl. 20, fig. 1, pl. 21, fig. 2.

— *erythrurus*, Rafinesque.

Ptychostomus duquesnii, Agassiz, Am. Journ. Sc. & Arts, XIX. 1854, p. 90.

Found in the Youghioghany River.

4. C. MACULOSUS.

The Jack Mullet, or Black Sucker.

Head large, square, declivous. Eyes small. Lateral line straight. Reddish, with irregular black blotches. Pectorals and ventrals reddish, dashed with black: anal and caudal reddish white: dorsal bluish, with black marks on the rays.

Fin-rays:—D. 12: P. 16: V. 9: A. 9: C. 18.

C. maculosus. Lesueur, Journ. Ac. Nat. Sc. Philad., I. 1817, p. 103.

This beautiful Sucker lives in the stony and rocky portions of our creeks, in places where the current ripples. Specimens may be seen resting motionless on a flat rock at the bottom of the water, and darting away with instant rapidity upon the approach of man. The larger ones take shelter beneath rocks, with cavities on the underside, and there they remain except when tempted away in search of food. This species inhabits the upper Potomac, the Patapsco, and several of our creeks near Baltimore.

Acad. Coll.

5. C. MACROLEPIDOTUS.

The Carp, or The Large-Scaled Sucker.

Body compressed and fusiform, elevated on its anterior part, rounded near the nape. The large scales are disposed in a lozenge form. The dorsal fin is deeply emarginated. The back is dark blue; the sides are whitish, with yellowish reflections: the head is reddish brown.

Fin-rays:—D. 16 ; P. 18 ; V. 9 ; A. 9 ; C. 18$\frac{5}{5}$.

C. macrolepidotus, Lesueur, Journ. Ac. Nat. Sc. Philad. I, 1817, p. 94; DeKay, New York Fauna, Fishes, p. 202, pl. 77, fig. 242.

This finest of all our suckers belongs to the region adjacent to the mouth of the Elk River. A very fine specimen was obtained near Spesutia Island by Major T. B. Ferguson.

It is esteemed in the Philadelphia markets, but is not brought to those of Baltimore. It well deserves to be protected and developed.

Acad. Coll.

CARPIODES, (Rafin.) Agassiz

C. CYPRINUS.

The Long-Finned Chuk-Sucker.

Body elliptical, compressed; its height is more than one-third of the total length. The anterior dorsal rays very much longer than the rest; caudal fin deeply forked. The scales are variegated with blue, yellow and green, and all the fins are grey-blue.

Fin-rays:—D. 27—32; P. 18: V. 9: A. 9—10: C. 18¼.

C. cyprinus, Guenther VII, p. 24.

Catostomus cyprinus, Lesueur, Journ. Ac. Nat. Sc. Philad. I, 1817, pp. 91, 110.

Labeo cyprinus, DeKay, N. Y. Faun. Fish. p. 194, pl. 77, fig. 243.

Sclerognathus cyprinus, Kirtland, Boston. Journ. Nat. Hist. V, p. 275, pl. 22, fig. 2.

Carpiodes vacca, Agass. in Am. Journ. Sc. & Art. XVII, 1854, p. 356.

This very singular fish inhabits the northern part of Chesapeake Bay near the mouth of the Elk River. It was formerly brought to the Baltimore markets, but recently has not appeared there. In the markets of Philadelphia it still holds a place, and finds a ready sale.

MOXOSTOMA, (Rafinesque,) Agassiz.

M. OBLONGUM.

The Common Mullet, or Horned Sucker.

Body robust, cylindrical. Scales large. Lateral line indistinct. Head smooth. Between the eyes and the snout, on each side, are from three to five tubercles. Eye very small, in the middle of the length of the head. The lower lip broad and bilobed. Head dark olive-green; back and sides of body green; sides tinged with yellow: abdomen yellowish. Anal fin dark blackish-brown: the caudal lighter, and the remaining fins light olive-green.

Fin-rays:—D. 15; P. 16; V. 8; A. 10; C. $19\frac{2}{2}$

M. oblongum, Mitch. Guenther VII, p. 21; Lesueur, Journ. Acad. Nat. Sc. Philad. 1817, I, p. 108; DeKay, New York Fauna, Fishes, p. 199, pl. 31, fig. 97.

This golden sucker inhabits the brackish water of the Patapsco River and two of its tributaries. The young ones may sometimes be seen among the Myriophyllum in the estuaries where the clear spring-water enters a cove, but not the older ones. The latter seem to enjoy the presence of the eel-grass, and sometimes may be seen there in small groups. Their food is at least in part vegetable, since undigested seeds in quantity have been taken from their stomachs.

Acad. Coll. S. I.

CARASSIUS, Nilsson.

C. AURATUS.

The Gold-Fish, Golden Carp.

This well-known fish has been so much influenced by domestication, that it is almost impossible to apply any distinctive phrase. There is an indefinite variety in color, shape, position of fins, even in their number, etc. It is generally long oval, brilliant red or orange above, silvery beneath. The scales are large, and rough to the touch. The following number of rays is often observed.

Fin-rays:—D. 16; P. 15; V. 9; A. 18; C. 17.

C auratus, introduced.

Cyprinus auratys, L. Syst. Nat., I. p. 527; Lacep. V. p. 553; Cuv. & Val., XVI. p. 101.

Found in moderate numbers in the Potomac River, south of Alexandria, where it has been introduced from abroad. Specimens from that locality are stout and clumsy, with large scales; and attain a length of at least one foot.

Acad. Coll. S. I.

EXOGLOSSUM, Rafinesque.

E. MAXILLILINGUA.

The Chub-Sucker.

The height of the body is nearly one-fifth of the total length (without caudal fin), the length of the head a little less than one-fourth. Caudal fin emarginate. Color olivaceous, smoky above; a blackish band from pectoral fin to superior extremity of gill opening.

Fin-rays:—D. 8; P. 12; V. 8; A. 8; C. 18.

C. maxillilingua, Guenther, VII, p. 188.

Cyprinus maxillilingua, Lesueur, Journ. Ac. Nat. Sc. Philad., I, p. 85.

Exoglossum maxillilingua, Agass. Amer. Journ. Sc. & Arts, 1853, XIX. p. 215; Cope. Journ. Ac. Nat. Sc. Philad., XIII. p. 360, pl. 11, fig. 1.

Sykesville, in Piney-run, tributaries of Patapsco River, Gwynn's Falls, above tide, Jones Falls and Pipe Creek.

The shovel-shaped lower jaw of this species admirably adapts it for lifting the small *Physas* and other shells from the rocks; and it is in the rocky parts of our streams that it is usually to be seen.

ACAD. COLL. S. 1.

SEMOTILUS, Rafinesque.

1. S. RHOTHEUS.

The Fall-Fish, Shiner, or Shining Dace.

Body rather deep, compressed, elongate; its height nearly one-fourth of total (without caudal.) Scales large, with the free margins festooned with elevated radiate lines., The colors are very brilliant, having as ground a very pure silver white; the back is often steel-blue, and sides of head bright rose colored. In spring and summer the adult males have rosy shades, and the dorsal and pectoral fins are crimson.

Fin-rays:—D. 1. 8; P. 17; V. 8; A. 8; C. 18.

Leuciscus pulchellus, Storer, Rep. Fish. Massach., p. 91; Cuv. & Val., XVII. p. 320.

— *nitidus*, DeKay, New York Fauna, Fish., p. 209, pl. 33, fig. 105.

Cheilonemus pulchellus, Storer, Mem. Am. Ac., V, 1855, p. 286, pl. 22, fig. 2.

Leucosomus pulchellus, Girard, Proc. Ac. Nat. Sc. Philad., 1856, p. 189; Guenther, VII, p. 268.

Hybognathus nitidus, Girard, l. c. p. 210.

Squalius hyalope, Cope, ibid. 1864, p. 280.

Semotilus rhoteus, Cope, Journ. Ac. Nat. Sc. Philad., XIII, p. 362, pl. 10, fig. 1.

Common in the Upper Potomac, in Frederick and Montgomery counties, also in the Monocany and upper portion of the Patapsco River.

Specimens from Frederick county have been caught, which weighed nearly five pounds.

Greatly esteemed as an article of food, and deserves to be propagated in large numbers.

ACAD. COLL. S. 1.

2. S. CORFORALIS.

The Little Fall Fish, or Corporaalen.

Similar in shape to *Semotilus rhoteus*, but well distinguished from it by the narrowness of the exposed portion of the scales anteriorly as compared with that posteriorly, by a dark spot at the base of the dorsal fin, and darker colors above. Its general color has not the vigor and beauty of *rhoteus*; it is blackish above, cream colored below, with a dark shade through the eye.

Fin-rays:—D. 1. 7; P. 17; V. 8; A. 9; C. $18\frac{5}{5}$.

Cyprinus corporalis, Mitchill, Am. Monthl. Mag. II p. 324; DeKay, New York Fauna, Fish. p. 213.

— *atromaculatus*, Mitchill, l. c.

Leuciscus atromaculatus, DeKay, l. c. p. 210, pl. 32, fig. 102.

Semotilus atrimaculatus, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 204.

— *corporalis*, Cope, Journ. Ac. Nat. Sc. Philad. XIII, p. 362, pl. 10, fig. 2.

Leucosomus corporalis, Guenth, VII. 269.

Occurs in the upper Potomac, in Montgomery and Frederick counties, but seems to be scarce.

ACAD. COLL. S. I.

CERATICHTYS, Baird & Girard.

C. BIGUTTATUS.

The Stony-Head.

This is a cylindrical, stout fish, with large scales; its head enters three and three fourths times into the length to the origin of the caudal fin. It is brownish cream-colored, shaded with slate above the lateral line, where the scales are tipped and margined with the same.

Fin-rays:—D. I.8; P. 15; V. 8; A. 7; C. 19.

C. biguttatus, Kirtland, Bost. Journ. Nat. Hist. III, 1840, p. 344.

Leuciscus biguttatus, DeKay, New York Fauna, Fish, p. 214.

Ceratichthys biguttatus, Cope, Journ. Acad. Nat. Sc. Philad. XIII, p. 366, pl. 11, fig. 5.

Common in many of the smaller streams of the central districts of the Western shore.

It is much esteemed in the regions where it lives, and being fried crisp with other small *Cyprinidæ* forms a very enjoyable dish of food.

It is becoming exterminated in several of the streams near Baltimore.

ACAD. COLL. S. I.

ARGYREUS, Heckel.

1. A. ATRONASUS.

Black-nosed Dace or Brook Minnow.

Body oblong, cylindrical, tapering; head small, flattened. In summer and autumn it is brownish olive above a black band, which extends around the nose to the origin of the caudal fin, and satin white below. In spring the latter region becomes vermilion red, and the lateral band assumes an orange hue; the pectoral and ventral fins become similar to the abdomen, and the rays of the former are greatly thickened.

Fin-rays: D. 8: P. 15: V. 8: A. 8: C. 19.

Rhinichthys atronasus, Mitchill, Lit. & Phil. Trans. New York, I p. 460; Guenther, VII, p. 191.

Argyreus atronasus, Storer, Mem. Am. Ac. V, 1855, p. 288, pl. 21, fig. 4.

Leuciscus atronasus, DeKay, New York Fauna. Fish, p. 205, pl. 23, fig. 69.

This pretty little fish delights in the Trout streams, in their small, shallow basins. It is also common in many of the springs and streams running therefrom in the central parts of Baltimore and Carroll counties. It is a favorite for aquaria.

ACAD. COLL. S. 1.

2. A. NASUTUS.

Black Chub.

This species is larger and more elongate than the last, with a most prominent and flattened muzzle. It is of a general olivaceous color, paler below, with numerous brown dots, sometimes extending over the sides of the belly, and almost blackening the upper surface. The lateral band of the *atronasus* is never seen. The lips and parts of check of the males, with the paired fins and the caudal, are of a bright crimson in Spring.

Fin-rays: D. 1. 8: P. 15: V. 8: A. 1. 7: C. 19.

Leuciscus nasutus, Ayres, Boston Journ. Nat. Hist. IV, p. 299, pl. 13, fig. 3; Storer, Mem. Amer. Acad. V, 1855, p. 289, pl. 22, fig. 1.

Rhinichthys nasutus, Agassiz, Lake Superior, Guenther, VII, p. 189.

Argyreus nasutus, Cope, Journ. Acad. Nat. Sc. Philadel., XIII, p. 369, pl. 12, fig. 5.

It lives in the small streams, chiefly in their rocky, rapid and grassy parts, but is only taken singly. Seems to belong to the clear waters of the higher levels not remote from the mountains.

ACAD. COLL. S. I.

STILBE, DeKay.

S. AMERICANA.

The Dace, The Shiner, The Chub, or Variegated Bream.

Body much depressed, deep; its depth being about one-third of the total length (without caudal). Head very small. The upper surface of the head and back is usually blackish, the rest of body white with a greenish, brassy or golden lustre.

Fin-rays:—1. 7$\frac{1}{1}$; P. 16: V. 9; A. 2. 14; C. 19.$\frac{2}{2}$

Cyprinus americanus, L. Syst. Nat. 1, p. 530.

Leuciscus chrysoleucas, Storer, Rep. p. 88.

Stilbe chrysoleucas, DeKay, New York Fauna, Fishes, p. 204, pl. 29, fig. 91.

Abramis versicolor, DeKay, l. c. p. 191, pl. 32, fig. 103.

Leucosomus americanus, Storer, l. c. V, p. 283, pl. 21, fig. 2.

Abramis americanus, Guenther, VII, p. 305.

ACAD. COLL. S. I.

CHROSOMUS, Rafinesque.

C. EOS.

The height of the body of this small species is a little less than the length of the head, which is one-fourth of the total (without caudal). In the Autumn the color is silvery below, with a dark band in the usual position of the lateral line, and a narrower dark line above it, confluent with the lower on caudal peduncle. Above the lower band are small brown spots.

Fin-rays:- I. 8: P. 16: V. 8: A. I. 8: C. 18.

Chrosomus eos, Cope, Proc. Ac. Nat. Sc. Philad., 1864, p. 281.

Phoxinus neogæus, Cope, Trans. Am. Phil. Soc. XIII, p. 375 and 391: Guenther, VII, p. 247.

In Stony Run, a tributary of the Patapsco River, with clear sandy bottom, and also in the Upper Potomac, in Washington county.

Acad. Coll. S. I.

CLINOSTOMUS. Girard.

1. C. FUNDULOIDES.

The height of the body equals the length of the head, which is one-fourth of the total (without caudal). A male in breeding dress is quite rugose, like *Hypsilepis diplæmia*, with tubercles on the back, sides, and the rays of the dorsal and anal fins. Above the lateral line dusky, with a yellowish band from the head to the tail; below the lateral line yellowish, red in spring.

Fin-rays:—D. 10: P. 16: V. 8: A. 9; C. 19.

Clinostomus funduloides, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 212: Cope, Trans. Am. Phil. Soc. XIII. p. 376, pl. 13. fig. 2.

Leuciscus funduloides, Guenther, VII. p. 256.

Caught in Piney Run, Carroll county. It seems to be rather uncommon.

Acad. Coll. S. I.

2. C. MARGARITA.

Head four times in body to base of caudal fin, equal the greatest depth. Coloration, above light olive, without dorsal line, but darker shade at origin of dorsal fin; sides plumbeous silvery, below bright crimson (in midsummer). Muzzle blackish; fins unspotted.

Fin-rays:—D. I. 8: P. 17: V. 8: A. I. 8: C. 19.

Clinostomus margarita, Cope. Proc. Ac. Nat. Sc. Phil. p. 377, pl. 13, fig. 1.

Leuciscus margarita, Guenther, VII, p. 246.

Three specimens from Piney Run, Carroll county. It has not yet been found in the streams near Baltimore, but is reported to be in the Potomac River, north of Washington.

Acad. Coll. S. I.

ALBURNELLUS, Girard.

A. rubellus.

This elegant little fish has a slender, compressed body, the height of which is contained six times in the total length (without caudal); the back is somewhat more convex than the tail. The back is of a yellowish-green, with the outlines of the scales black; the sides have a brilliant silvery reflection, with a more marked median band; the fins are transparent, pale yellow.

Fin-rays: D. 1. 9; P. 11; V. 8; A. 2. 10; C. 19¼.

Alburnellus rubellus, Agassiz, Lake Super, p. 364, pl. 3, fig. 1—3; Cope, Proc. Ac. Nat. Sc. Philad. 1864, p. 282.

Leuciscus rubellus, Guenther, VII p. 254.

Inhabits Pipe Creek, in Carroll county, and seems to be common there. No specimens have thus far been found in the streams near Baltimore, and it is no doubt a species belonging to the mountain region.

Acad. Coll.

HYPSILEPIS, Baird.

1. H. kentuckiensis.

The White-Fin.

The height of the body is contained four times in the total length, (without caudal), the length of the head four times and one-third. General color leaden silvery, darkest on the sides; the scales above and below, a dorsal band and large spot on hinder part of dorsal fin, blackish; top of head shaded with the same. The inferior fins, and even the tip of the caudal, and anterior part of the dorsal, are filled with a satin-white pigment in spring and summer, which gives the fish the name "White or Silver Fin." At the same time small tubercles appear upon the head and muzzle of the male.

Fin-rays: D. 8: P. 12: V. 8: A. 9: C. 22.

Leuciscus Kentuckiensis, (Rafin.) Kirtland, Bost. Journ. Nat. Hist. VI, p. 27, pl. 8, fig. 3; Storer, Mem. Am. Ac. II, p. 410; Guenther, VII, p. 251.

Hypsilepis Kentuckiensis, Cope, Trans. Am. Phil. Soc. XIII, p. 371, pl. 11, fig. 3.

Common in all our creeks beyond the reach of tide-water. It delights in the little pools between the rocks, and in the sandy basins, and attracts the observer by the delicate beauty of its silver fins in reflecting the sun-light as it turns its sides.

ACAD. COLL. S. I.

2. H. CORNUTUS.

The Red-Fin, or Rough-Head.

Body cylindrical, tapering; greatest depth in front of the dorsal fin, where the back is slightly arched. Scales large. In the breeding season minute tubercles appear on the summit and the sides of the head, extending as far back as the dorsal fin. Color above dark impure blue: sides from rosy to silver-white: the scales in adults blackish at basis. Anal, ventral, and pectoral fins in males, crimson in spring and summer.

Fin-rays: D. 1.8: P. 1.15: V. 8: A. 1.9: C. 4.19.5.

Leuciscus cornutus, Storer, Bost. Journ. Nat. Hist. IV, p. 183; DeKay, New York Fauna, Fishes, p. 207, pl. 20, fig. 92; Guenth. VII, p. 249.

Hypsilepis cornutus, Cope, Trans. Am. Phil. Soc. N. S. XIII, p. 372.

Widely distributed in Eastern North America, in the fresh water streams, from Montreal to Virginia. In Maryland it occurs in the rivers and their tributaries, and always attracts the attention of juvenile fishermen by the bright red of its fins and head. In the spawning season, which occurs in the month of June, its body is usually suffused with a tint of rose pink, which it loses after this period is past. It has been frequently met with in large numbers in the quiet pools of mill dams.

ACAD. COLL. S. I.

3. H. DIPLEMIA.

The Warty-Chub, or Red-Sides.

The height of the body is contained thrice and three-fourths in the total length (without caudal), the length of the head four times. Snout rounded, and warty in the males during the breeding season. Color dusky above, the sides and belly silvery, without band; below crimson in spring. A large black spot at base of dorsal fin.

Fin-rays:—D. 1.9: P. 12: V. 8; A. 1.11; C.—18.—

Leuciscus diplemius, (Rafin.) Kirtland, Bost. Journ. Nat. Hist. V, p. 276, pl. 22, fig. 3; Guenth. VII, p. 250.

Hypsilepis, diplæmia, Cope, Trans. Am. Phil. Soc. XIII, p. 373.

Inhabits the upper Potomac, in Washington county.

ACAD. COLL.

HYBOPSIS, Agassiz.

1. H. HUDSONIUS.

The Spawn-Eater.

Head and body oblong, the dorsal outline somewhat arched near the dorsal fin. The length of head somewhat more than one-fifth of the total (without caudal), the height of the body one-fourth. Nose blunt; eyes large; scales very deciduous. Yellow olive above dorsal line, with brown-edged scales; below yellowish white. No distinct spot at base of dorsal fin.

Fin-rays:—D. 1. 8: P. 15; V. 19; A. 1. 8; C. 19.

Leuciscus hudsonius, DeKay, Nat. Hist. New York, Fishes, p. 206, pl. 34, fig. 109; Storer Synops. p. 157; Agassiz, Lake Superior, p. 272; Guenther, VII, p. 251.

Hudsonius fluviatilis, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 210.

— *amarus*, Girard, l. c.

Hybopsis phaenna, Cope, Proc. Ac. Nat. Sc. Phil. 1864, p. 279.

— *hudsonius*, Cope, Trans. Am. Phil. Soc. XIII, p. 386, p. 386, pl. 12, fig. 3.

Usually confounded with our common gudgeon, which it closely resembles. It seems to be uncommon, but a few specimens have been taken in the fresh-water part of the Patapsco River.

Acad. Coll. S. I.

2. H. procne.

This small species may be readily distinguished by its long caudal peduncle and tail, its large brown-edged dorsal scales, and plumbeous lateral band. The height of the body is about one-fifth of the total length (without caudal), the length of the head somewhat less than one-fouth. The fins are unspotted, and a blackish line runs along the lateral line.

Fin-rays:—D. 1. 8; P. 12—13; V. 1. 8; A. 1. 7; C. 19.

Leuciscus procne, Guenther, VII, p. 260.

Hybognathus procne, Cope, Proc. Acad. Nat. Sc. Philad., 1864, p. 283.

Hybopsis procne, Cope. Journ. Ac. Sc. Philad. XIII. p. 385, pl. XI, fig. 2.

Found in the Upper Potomac and in the Canal, Washington county, by Major J. B. Ferguson.

Acad. Coll. S. I.

HYBOGNATHUS, Girard.

H. REGIUS.

Minnow.

Body elongated, compressed, its depth being one-fifth or rather less than one-fifth of the total length (without caudal): the length of the head is one-sixth of the total. Coloration uniform.

Fin-rays:—D. 11; A. 11.

H. regius, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 209.

Common in the upper parts of the Patapsco River, in the Potomac, and in all the larger creeks of Baltimore county, north and west of the city

ACAD. COLL. S. I.

LVI.—SILURIDÆ.

ÆLURICHTHYS, Baird & Girard.

Æ. MARINUS.

The Oceanic Cat-Fish, or Fork-Tailed Cat-Fish.

Body cylindrical, tapering behind: its greatest depth at the origin of the first dorsal, where it is one-sixth of the total length. Skin smooth. Head broad, flattened above, smooth, with a few scattering patches of granulations. Jaws equal, broad and rounded. Two flattened barbels depend from the chin, and two similar ones from the angle of the mouth. The first dorsal fin is high, triangular, with one bony and seven soft rays, the first ray rough in front, three inches high, but continued six inches further by a soft, flat filament, ending in a fine point. First pectoral fin bony, strongly dentated behind, and with a similar filament as the first dorsal fin. Small adipose fin. Blue above, tinged with green: abdomen white.

Fin-rays:—D. 1.7: P. 1. 12: V. 6: A. 23: C. 17.

A. marinus, Guenther. V, p. 178.

Silurus marinus, Mitch. Lit. & Phil. Tran. New York, I, p. 433.

Galeichthys parra, Cuv. & Val., XV, p. 33.

— *marinus*, DeKay, New York Fauna, Fishes, p. 178, pl. 37, fig. 118 (bad.)

Ælurichthys marinus, Girard, Ichth. U. S. & Mc. Bound., pl. 14.

Enters Sinepuxent and Chesapeake Bays from the ocean: but is quite unpopular with the people of the southern counties of the Eastern Shore. It is said to have become less common than formerly.

Acad. Coll.

NOTURUS, Rafin.

N. flavus.

The Yellow Back-tail. The Stone Cat-Fish.

Shape of the common Cat-Fish, but distinguished at once by having the second dorsal fin, which is very long and decurrent, connected with the tail; it has only rudiments of an immature adipose fin. Anal fin elongate, widened behind. Back and head yellowish-olive; sides yellow; nose, throat and abdomen white. Fins slightly dusky, diaphanous.

Fin-rays:—D. 1.7: P. 1.7: V. 8: A. 1. 7: C. 19.

Quite common in the Potomac River and Canal along the boundary of Washington county. It is also in the rocky parts of the Patapsco River, and smaller streams near Baltimore. Lives beneath the stones in the streams running through the metamorphic rocks in Baltimore county.

Acad. Coll. S. I.

AMIURUS. Rafin.

1. A. catus.

The Common Cat-Fish, or Horned Pout.

Body elongate, depressed before the anterior dorsal, compressed behind. Head flattened, smooth; a short, erect barbel at the hind margin of nostril, two thick and fleshy barbels depend from the upper jaw, and four from lower jaw. Body smooth, scaleless. Eyes small. Second dorsal fin adipose and elongated.

Pectoral fin with a stout, serrated spine, which, by an ingenious mechanism, becomes fixed and immovable at the will of the animal, and serves as an important arm of defense. Dusky, with a deeper shade on the back and summit of head. Sides of head with a greenish tint; coppery on the sides. Abdomen pearl-grey. Fins dusky, but become tinged with red after dead.

Fin-rays: D. 16: P. 1. 8: V. 8: A. 23: C. 19.

A. catus, Guenther, V, p. 99

Silurus catus, L. Syst. Nat. 1, p. 504; Cuv. & Val., XV, p. 124, pl. 432, DeKay, New York Fauna, Fishes, p. 182, pl. 37, fig. 119; Girard, Proc. Acad. Nat. Sc., Phil. 1859, p. 160.

Brought in huge piles to the Baltimore markets, and is an abundant and cheap food for the poorer classes. Specimens from the deeper basins of the Potomac River measure sometimes as much as 18 inches in length, and are stout in proportion.

It is common in the tidewater part of the Patapsco river, but does not attain to such a large size as specimens from the Potomac.

2. A. LYNX.

The Channel Cat.

The head, which is longer than broad, forms a little less than the fourth of the total length. The upper jaw is somewhat longer than the lower one. The eyes are rather large, their diameter being contained seven times in the length of the side of the head, and four times and a half across the interocular space. The anterior margin of the dorsal fin is equidistant between the apex of the snout and the origin of the adipose. The posterior edge of the caudal is moderately emarginated; the fin itself constituting not quite the sixth of the total length. The upper regions are bluish-black, whilst the abdomen is whitish.

Fin-rays: D. I. 5. 1: P. 1. 9: V. 8: A. 20: C. 5. 1. 8. 7. 1. 4.

A. lynx, Girard, Proc. Ac. Nat. Sc. Phil., 1859, p. 160.

This occurs in the Potomac and Patapsco Rivers in the same places as *A. catus*, and near Baltimore is the joy of the poor colored people, who catch it in considerable numbers.

It does not seem to grow to such large size as the preceding.

ACAD. COLL. S. 1.

LVII.—CONGRIDÆ.

CONGER. Cuv.

C. OCEANICA.

The Conger Eel.

Head nearly one-eighth of the total length, pyramidal, flattened above. Lateral line distinct, and with a series of whitish punctures through its whole length. Eyes large; lips large and fleshy. The tail ends in an acute tip. Pectorals oblong, with seventeen rays. The dorsal fin is continuous with the caudal and anal. Dark olive-brown above; chin, space behind pectorals, and all beneath soiled white. Dorsal and anal of a deep black-hue along their margins.

Fin-rays:—P. 17; D. C. & A., 539—550.

C. oceanica, Mitch. Journ. Ac. Nat. Sc. Philad., I. p. 407.

Common in the lower Potomac, and in the parts of rivers within the reach of tide. Brought to our markets in large numbers, and find a ready sale.

ACAD. COLL.

LVIII.—ANGUILLIDÆ.

ANGUILLA, Cuv.

A. BOSTONIENSIS.

The Common Eel or Fresh-Water Eel.

Body cylindrical, compressed behind, terminating in a point. Head equal to about one-tenth the length of the body, compressed above, tapering to a blunt point at the snout. Lips fleshy; lower jaw slightly longest. Greenish, or olive-brown above; yellowish, or yellowish-white beneath; frequently with a reddish tinge along the margin of anal fin.

Fin-rays:—P. 16; D. C. & A., 450—460.

A. bostoniensis, Ayres, Boston Journ. Nat. Hist., IV, p. 279; Storer, Mem. Am. Acad., VIII, p. 408, pl. 33, fig. 1.

— *lutea* (Rafin.,) Kirtland, Bost. Journ. Nat. Hist., IV, p. 234, pl. 11, fig. 2.

— *tenuirostris*, DeKay, New York Faun., Fishes, p. 310, pl. 53, fig. 173.

This is the common eel of our creeks and small rivulets, being found sometimes in large numbers among the rocks at the foot of a cascade. They remain in these streams during the whole year, at least the smaller ones do.

Acad. Coll. S. 1.

LIX.—LEPIDOSTEIDÆ.

LEPIDOSTEUS, Lacep.

L. osseus.

The Gar-Pike.

Body elongated, cylindrical, compressed towards the tail. Scales arranged in oblique series; they are smooth, thick, rhomboidal, terminating on the caudal fin in an oblique line, which is directed from above, forwards. They are of stony hardness in dried specimens, but may be cut with a knife in recent fish. Head square, rounded above, elongated; eyes large. Soiled yellowish: darker above. A broad, longitudinal band of dusky brown extends from the opercles to the tail just beneath the lateral line.

Fin-rays:—D 8; P. 14; V. 7; A. 10; C. 14.

L. osseus, Guenther, VIII, p. 330.

Esox osseus, L. Syst. Nat. 1, p. 516; Mitch. Trans. Phil. & Lit. Soc. N. York, 1, p. 444.

Lepidosteus bison, DeKay, New York Fauna, Fish, p. 271, pl. 43, fig. 139.

— *oxyurus*, Cope, Proc. Ac. Nat. Sc. Philad. 1868, p. 87; Kirtland, Report, p. 170, 196, and Boston Journ. Nat. Hist., IV, p. 16, pl. 1, fig. 1.

Common in the brackish water of the Potomac, Patapsco and some of the rivers of the Eastern Shore; not sold for food.

Acad. Coll. S. 1.

LX.—ACIPENSERIDÆ.

ACIPENSER. Artedi.

A. OXYRHYNCHUS.

The Sharp-Nosed Sturgeon.

Body elongated, pentagonal. Entire surface granulated, excepting that occupied by five longitudinal rows of flattened plates, of the same structure as the covering of the head, but of a lighter color. The largest plates form the dorsal ridge; in younger specimens these plates are compressed on the sides, and terminate above in strong, sharp, recurved spines. The head flattened above, slightly depressed between the eyes, and terminates at the occiput in a rounded plate, pointed in the immature fish. Snout blunt; eyes small; lips fleshy, bilobed; mouth on underside of head; between snout and mouth are four barbels. Greyish-brown above, silvery upon the inferior body of sides. Upper lobe of caudal twice as long as the lower.

Fin-rays:—D. 38; P. 28; V. 24; A. 23; C. 125.

Acipenser oxyrhynchus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 462; Lesueur, Trans. Am. Phil. Soc. New Ser. I, p. 394; DeKay, New York Fauna, Fishes, p. 346, pl. 58, fig. 189; Ayres, Boston Journ. Nat. Hist. IV, p. 287; Storer, Mem. Am. Acad. II, p. 499, and VIII, p. 431, pl. 35, fig. 4.

Common in the Susquehanna and Potomac Rivers.

Sometimes, but not commonly, brought to the Baltimore markets.

ACAD. COLL. S. 1.

LXI.—MYLIOBATIDÆ.

ÆTOBATIS, Mull. & Henle.

A. NARINARI.

The Bishop-Ray.

Form of head, body and tail very much like that of *myliobatis*: smooth. The dorsal fin situated between the ventrals. The nasal valves separate, each forming a long flap. Teeth flat, broad, forming a single series; teeth of the lower jaw sometimes angularly bent, sometimes nearly straight. The very long tail with four or five spines. Disk generally with numerous round, bluish-white spots.

A. narinari, Muller & Henle, p. 179: Guenther, VIII, p. 492.

Goniobates flagellum, Agass. Proc. Boston Soc. Nat. Hist. VI, p. 385.

Enters Chesapeake Bay from the ocean, and is caught in seines near Norfolk, Va.

S. 1

RHINOTERA, Kuhl.

R. QUADRILOBA.

The Cow-Nosed Ray.

Body rhomboidal, elevated along the dorsal line. Pectorals acute. Tail slender, longer than the body. Muzzle divided into two short lobes, under which are two similar ones. Head distinctly projecting from the pectorals. Teeth broad and flat. Olive-brown above, beneath white. Width two feet.

R. quadriloba, Guenther, VIII, p. 494.

Raja bonasus, Mitch. Trans. Lit. & Phil. Soc. New York, 1, 1815, p. 479.

— *quadriloba*, Lesueur. Journ. Ac. Nat. Sc. Philad. I, p. 44.

Rhinoptera quadriloba, Cuv. Regne Anim.; DeKay, New York Fauna, Fishes, p. 375, pl. 66, fig. 217.

In the drains of the ocean at the entrance to Sinepuxent Bay, and near the mouth of the Chesapeake Bay.

ACAD. COLL.

MYLIOBATIS, Cuv.

M. FREMINVILLII.

The Sharp-nosed Ray.

Body rhomboidal, head prominent beyond the pectorals, which are wide. Teeth wide, flat, paved. Orbit salient, surrounded by an eminence. Ventral rounded. Tail very long, filiform, triangular, armed above with a serrated spine, and furnished with a fin. Above olivaceous; more or less deep in different specimens, paler on the margins, and sprinkled with distinct rounded spots; beneath white. Width two to three feet.

M. freminvillii, Lesueur, Journ. Ac. Nat. Sc. Philad. IV p. III.

Enters Chesapeake Bay from the ocean.

S. I.

LXII.—CEPHALOPTERIDÆ.

CERATOPTERA, Mull. & Henle.

C. VAMPYRUS.

The Devil-Fish.

Body large; the transverse much exceeding its longitudinal diameter. Skin rough to the touch, but without any evident tubercles or spines. Head not distinct from the body, subtruncate in front, slightly convex. Mouth with very small teeth in seven or eight rows. Eyes prominent, lateral, four feet apart. Tail long, longer than body, slender, compressed, terminating in a slender extremity, and armed with one or more spines. Dorsal fin small, triangular, with thirty-six rays; placed over the base of the tail between ventrals. Pectorals much elongated, arched in front, concave behind, projecting on each side of the mouth, and used as instruments of prehension. Ventrals broad, sharp, deeply emarginated and rounded behind; continuous in front with the pectorals. Blue-black above: dusky, varied with large, opaque, white clouds, beneath. Length to base of tail, 10 feet; to the end of tail, 16 feet; width across the tips of the pectorals, 17 feet.

C. vampyrus, Guenther, VIII p. 498.

Cephalopterus vampyrus, Mitchill, Ann. Lyc. Nat. Hist. New York, 1823, I p. 23, pl. 2, fig. 1: DeKay, New York Fauna, Fishes, p. 377, pl. 67, fig. 219.

giorna, Lesueur, Journ. Ac. Nat. Sc. Philad. IV, p. 115, pl. 6.

Ceratoptera vampirus, Dumeril, Elasmobr. p. 660.

This huge monster of the deep is found in the drains of the ocean, near Sinepuxent Bay, and occasional near the entrance to Chesapeake Bay.

LXIII—TRYGONIDÆ.

PTEROPLATEA, Muller & Henle.

P. MACLURA.

The Broad Sting-Ray, or Butterfly Ray.

Body oval, elliptical, broader than long; snout blunt, not produced beyond the lateral margins of pectoral fins, but contiguous with them. Surface rough; eyes small, near the snout; mouth with minute, triangular, sharp teeth, each emarginated at base to receive the hind teeth. Ventral fins short, broad and rounded. Tail short, one-third as long as body, triangular, with one or two spines near the base. Above greenish-blue, with small, black, vermicular, interrupted lines, and larger, distant, pale spots: beneath pale red; length 15 to 18 feet.

P. maclura, *l. c. p.* 169.

Raja maclura, Lesueur, Journ. Ac. Nat. Sc. Philad. I p. 41.

Pastinaca maclura, DeKay, New York Fauna, Fishes, p. 375, pl. 65, fig. 213.

Occasional on the coast of Worcester county.

S. I.

TRYGON, Adanson.

T. CENTRURA.

The Stingaree.

Body quadrilateral, rounded on the pectoral angles: its transverse and longitudinal diameter nearly equal. Snout pointed: teeth small, flat, lozenge-shaped. Upper surface of body smooth, covered with dark slime. Tail longer than body, cylindrical, rough, tapering and flexible towards the end: armed with two or more small, flattened, pointed and teethed spines. Above uniform olive-brown: beneath white. Length of body and tail 5 to 8 feet.

T. centrura, Mitch.

Common on the ocean coast of Worcester county and around the entrance to Chesapeake Bay.

ACAD. COLL. S. I.

LXIV.—TORPEDINIDÆ.

TORPEDO. Dumeril.

1. T. OCCIDENTALIS.

The Torpedo or Cramp-Fish.

Disk of body nearly circular; pectoral fins large; two dorsal fins placed so far back as to be on the tail; surface of body smooth; tail short and rather thick; teeth sharp and small. Very broad across pectorals, which are rather less than half the entire length; caudal fin nearly triangular, straight at its posterior margin. Eyes very small. Whole upper surface dark brown, with a few, almost black, dots distributed over it; beneath white. Length 4 feet 2 inches: width 3 feet.

T. occidentalis, Storer, Mem. Am. Ac. II, p. 576, IX, 1867, p. 247, pl. 39, fig. 15, and Proc. Bost. Soc. Nat. Hist. II, p. 7.

Said to occur very rarely in the region near the entrance to Chesapeake Bay, and comes from the ocean.

LXV.—RAJAIDÆ.

RAJA, Artedi.

R. EGLANTERIA.

The Prickly Skate, or Clear-Nosed Ray.

Body flat, semiorbicular behind, with a wide, rounded emargination each side before, near the spiracles, anterior to which the edge is dilated opposite to the eyes, and then is contracted so as to form a short, rounded rostrum. A longitudinal series of from nine to twelve simple spines on each side upon the pectorals; tail longer than the body, with two fins at its tip. Above reddish, sprinkled with small spots;

beneath whitish, with reddish tints. Length 15 --19 inches: width 7 to 10 inches.

R. eglanteria, Lacep. II, pp. 103, 109, tab. 4, fig. 2: Lesueur, Journ. Ac. Nat. Sc. Philad. IV, p. 103, pl. 6: Storer, Mem. Am. Ac. II, p. 512.

Rather uncommon, mostly taken in spring, and occasionally eaten, but not prized as an article of food. Belongs to the ocean and around the mouth of Chesapeake Bay.

2. R. ERINACEUS.

The Summer Skate.

Form rounded. Snout pointed. Head somewhat distinct from body, with rounded cheeks, upon which are prickles: eyes large, oblique. Surface smooth, with several groups of prickles arranged in regular series. A triangular group of prickles on the back; two rows each of about twenty erectile ones, on the pectoral fins: a double dorsal series, extending along the whole length of the tail, where they are stout and stiff. Beneath smooth. Two triangular dorsal fins near extremity of tail. Pectorals broad and rounded; ventrals two-lobed, deeply emarginated. Tail nine inches long, smooth on all sides, except the double lines of spines described. Male appendages cylindrical. Length 17 inches. Pale brown above, with numerous dark brown spots; paler beneath.

R. erinaceus, Mitch. in Sillim. Journ. 1825, IX, p. 290, pl. 6, (copied by DeKay, New York Fauna, Fishes, p. 372, pl. 78, fig. 246): Storer, Mem. Am. Acad. II, p. 511.

Found on the ocean coast of Worcester county.

3. R. LÆVIS.

The Smooth Skate, or Barn-Door Skate.

Form rhomboidal. Small spines on the orbits, and anterior margins of pectoral fins; rest of body smooth. Three rows of spines on tail. Snout blunted. Length of head to entire length nearly one to four. In the *male*, the under surface of the snout and exterior of the nostrils to the angle of the jaws, roughened by innumerable minute tubercles. *Male* of uniform light-brown color. *Female* with blackish ocelli. Length 2 to 5 feet.

R. lævis, Mitch. Amer. Monthl. Mag. 1818, p. 327; DeKay, New York Fauna, Fishes, p. 370; Storer, Mem. Amer. Acad. IX, 1867, p. 242, pl. 39, fig. 2.

Raja batis, Storer, Report, p. 193.

Not uncommon in the ocean on the coast of Worcester county, but said to be scarce in the Chesapeake Bay.

S. I.

LXVI.—PRISTIDÆ.

PRISTIS, Latham.

P. ANTIQUORUM.

The Saw-Fish.

As once distinguished by its very long, depressed muzzle, in the form of a sword, armed on each side with strong, bony spines, pointed and implanted like teeth (24 on each side). The mouth is under the head, and contains the true teeth, which are small and rounded. This fish unites to the elongated form of the sharks a body, flat in front, and gills, pierced beneath, as in the Rays or Skates. The skin is finely shagreened. Dusky above, pale grey beneath. Length 12 to 15 feet, including the saw.

P. antiquorum, Latham, Trans. Linn. Soc. 1794, II, p. 277, pl. 26, fig. 1.

Occurs in the ocean off our coast, but occasionally enters Chesapeake Bay.

ACAD. COLL.

LXVII.—LAMNIDÆ.

CARCHARODON, Muller & Henle.

C. ATWOODI.

The Man-Eater.

Body very short anterior to the ventral fins. Pectorals large. Anal back of second dorsal. Teeth in both jaws, triangular, serrated; those of the lower jaw the smaller. About twenty-four teeth in each row. Above leaden grey: white beneath. Nearly 13 feet in length.

C. atwoodi, Storer, Proc. Bost. Soc. Nat. Hist. III, 1848, p. 71; Gill, Proc. Ac. Nat. Sc. Philad. 1864, p. 260.

Enters Chesapeake Bay and roams over its entire length. It proceeds sometimes as far as to the outer harbor of Baltimore, and is generally the terror of bathers in the Patapsco River.

LXVIII.—ALOPECIDÆ.

ALOPIAS, Mull. & Henle.

A. VULPES.

The Thresher Shark.

Body cylindrical, thickest before the dorsal fin, with a ridge on its upper surface towards the tail, and a deep cavity at the base of caudal fin. Back regularly arched from above the pectorals to the end of the snout, which is blunt. Skin roughened with minute prickles, which are directed backwards, and obvious to the touch. Mouth in shape of a horse-shoe, with three rows of distant, flat, triangular, smooth-edged teeth in each jaw. Upper lobe of the tail nearly as long as the body. Length 12 to 15 feet. Slate-blue above: beneath soiled white, marked with obsolete bluish spots upon the outer edges of the abdomen. Pupils a longitudinal slit. The flexible tail is its principal arm of defence, it literally threshes its enemy.

A. vulpes, Guenther VIII, p. 393.

Squalus vulpes, Gm. L. Syst. Nat. I, p. 1496; Mitch. in Phil. & Lit. Trans. N. York, I, p. 482.

Carcharias vulpes, Cuv. Regne. Anim: DeKay, New York Fauna Fishes, p. 348, pl. 61, fig. 199.

Alopias vulpes, Storer, Mem. Am. Ac. II, p. 505.

Common in the ocean off Worcester county, it frequently takes hooks for other fish.

LXIX.—GALEORHINIDÆ.

EULAMIA. Mull. & Henle.

E. MILBERTI.

The Blue Shark.

Body cylindrical, deepest in front of the first dorsal fin. Surface covered with minute, distant and oblong scales, fluted longitudinally, so as to be sensibly rough. Eyes large; nose blunt, conical; teeth in several series, small, triangular, serrate. Pectorals broad. Length two to six feet. Slate-blue on the upper part of head, body and superior fins: the same color, but lighter, extends over the upper part of pectoral and ventral fins. All beneath whitish.

Squalus cæruleus. Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 487.

Carcharias cæruleus, DeKay, New York Fauna, Fishes, p. 349, pl. 61, fig. 200: Guenther, VIII, p. 363.

Lamna caudata, DeKay, l. c. p. 354, pl. 62. fig. 205.

Carcharias, (Prionodon), milberti, M. & H. p. 38, pl. 19, fig. 3, (teeth).

Eulamia milberti. Gill. Proc. Ac. Nat. Sc. Philad. 1864. p. 262.

Quite common on the coast of Worcester county, and in the drains emptying into the ocean.

Acad. Coll.

GALEOCERDO, Muller & Henle.

G. TIGRINUS.

The Tiger Shark.

Body cylindrical, with a moderate flat snout; caudal elongated; last two branchial apertures above the pectorals; anal fin, with the anterior lobe little produced and rounded. Distinguished at once by its spotted body.

G. tigrinus, Muller & Henle, p. 59, pl. 23; Gill, Proc. Ac. Nat. Sc. Phil. 1864, p. 263.

— *maculatus*, Poey, Report Fish Nat. Cuba, 1868, p. 453.

Sometimes enters Chesapeake Bay, and is also on the ocean coast of Worcester county.

MUSTELUS, Cuv.

M. CANIS.

The Smooth Dog-Fish.

The slender body is cylindrical, tapering, elongated. Head flattened above; snout thin, obtusely pointed. Surface of body rough. Mouth crescent-shaped when opened, triangular when closed. Teeth on the jaws, smooth, flattened, rhomboidal, distributed in about ten rows. Both dorsal fin similar in shape; caudal fin bilobed. Length 2 to 4 feet. Uniform dull ashen-grey; white beneath. Upper edges of dorsals and anal bordered with black; ventrals and anals opaque white: lower lobes of caudal bordered with white or greyish.

M. canis, Storer, Amer. Acad. IX, 1867, p. 227, pl. 37, fig. 2; DeKay, New York Fauna, Fishes, p. 355, pl. 64, fig. 209.

Very common on the coast of Worcester county and on the southern shores of the Eastern peninsula.

Acad. Coll. S. I.

LXX.—SPINACIDÆ.

SQUALUS, Artedi.

S. AMERICANUS.

The Picked Dog-Fish.

Squalus americanus, Mitchill, Phil. & Lit. Trans. New York, I p. 483; DeKay, New York Fauna, Fishes, p. 366; Storer, Bost. Journ. Nat. Hist. 1844, IV p. 188.

— *macrodus*, Mitchill, Am. Monthl. Mag. II, 1818, p. 328.

Odontaspis americanus, Abbott, Proc. Ac. Nat. Sc. Philad. 1861, p. 399.

Occasional near the mouth of Chesapeake Bay and in the ocean adjacent.

LXXI.—PETROMYZONTIDÆ.

PETROMYZON, Artedi.

P. AMERICANUS.

The American Sea-Lamprey or Lamprey-Eel.

Bluish brown, mottled with black olive-green, which is the general color along the back; beneath silvery grey; first dorsal fin greenish; the second reddish; tail dark brown.

Body cylindrical anteriorly, compressed posteriorly, and terminating in an acute tip; a slight keel upon the back.—Head depressed, and when the mouth is closed, obtusely conic; a singular tubular orifice equidistant from, and slightly anterior to the eyes. Mouth forming a longitudinal fissure, and when attached to any object assumes the form of a regular circle. Teeth of various kinds, which may be considered as disposed in concentric circles about a common centre: in the throat, and partly closing it, are three large teeth.

Fin rays:—D. 80. 90; C. 80.

-- *americanus*, Lesueur, Trans, Am, Phil. Soc. I p, 383; DeKay, New York Fauna, Fishes, p. 379, pl. 66, fig. 216; Storer, Mem. Am. Acad. IX, p. 251, pl. 28, fig. 4.

Common in the lower part of the Potomac River, and even found in the fresher waters of that river, beyond the reach of tide. Occasionally occurs in the Gunpowder and Back Rivers. The young ones run long distances up our stony creeks and branches many miles from brackish waters.

Acad. Coll. S. I.

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Public General Laws

ON

FISH AND FISHERIES.

FISH AND FISHERIES.

PUBLIC GENERAL LAWS. ART. 41.

HEAD OF BAY.

Sec. 1. No person except resident citizens of this State, shall fix, set or stake out any set of gill-nets, either stationary or floating, or any device whatever, for the taking of Herring and Shad in the Chesapeake Bay, at any time between the first of March and the first of June in each year, and any person so offending shall forfeit the vessel and tackle used in such fishing, and all the nets, apparatus and devices for taking fish, and also pay a fine of fifty dollars for each offence.

None save resident citizens.

Forfeiture.

Laws 1868, *Chap.* 421, *Sec.* 2. *This Act repeals Sec.* 2, *Art.* 41, *Code of Public General Laws and re-enacts the same as in the text.*

Sec. 2. No person shall, from the tenth day of June until the thirty-first of July, in each year, fish by gill-net or hauling seine, within the waters of the Chesapeake Bay, lying within the bounds of Cecil, Kent and Harford counties, or any of its tributaries within said counties, unless with seines usually called market seines, which are used for catching summer fish; nor shall any person except resident citizens of this State, or the owners or tenants of lands or shores bordering on any of said waters so lying within said counties, fish by gill-net, hauling seine, or any device whatever, within the aforesaid waters, at any period of the year, unless by permission of the owners or tenants of the lands or shores aforesaid; and any person violating and offending against either provision of this section shall forfeit the boats, nets and seine, or other fixtures used by such offender at the time of so violating the same.

Shall only use market seines.

Forfeiture.

Shall not fix stakes above Poole's Island.

Sec. 3. No person shall place in the head waters of the Chesapeake Bay, or in the Sassafras, Elk, Bohemia, North East or Susquehanna Rivers, or in any of their tributaries, any stakes, piles or other thing for the purpose of attaching seines or nets thereto, with the view of taking Shad or fish of any description; this not to apply to any portion of said Bay below Poole's Island.

Sec. 4, is repealed by Chap. 190, *Laws* 1872.

Forfeiture.

Sec. 5. Any person violating either of the two preceding sections, shall forfeit the seine or nets attached as aforesaid, and the boats and materials used for fishing the seine, and shall also for each offence pay a fine of fifty dollars.

No vessel shall anchor.

Sec. 6. No vessel, float of timber or plank, or of any other materials, or of any description or kind whatsoever, nor any boat of any description, unless compelled to do so, by stress of weather, or other unavoidable accident, shall be anchored or stayed in any fishery in the Susquehanna River, or at the head of the Chesapeake Bay, at any time between the first day of April, and twentieth day of May, in any year, and remain thus anchored for the space of half an hour, when the weather will admit of the departure of such vessel, float or boat, after being ordered to depart therefrom by the owner or occupier of such fishery; the usual haul of a seine from any floating battery anchored between Spesutia Island, and Point Concord in the Chesapeake Bay, for the purpose of fishing, shall be to all intents and purposes considered as a fishery within the meaning of this section.

Fine.

Sec. 7. Any person violating the preceding section shall pay a fine of twenty dollars for each offence, and every hour the vessel or other obstruction continues after the half hour mentioned in the preceding section shall be considered a new and separate offence.

Skipper shall pay fine.

Sec. 8. The skipper, the captain, owner or occupier of the vessel, float or boat referred to in the two preceding sections, shall be liable to pay said fine, and the vessel, float or boat so anchored or stayed as above mentioned, shall also be liable to be seized and sold to pay any fines imposed under the preceding section.

Shall have damages.

Sec. 9. If any such vessel, float or boat shall be willingly, wantonly and maliciously, or from gross negligence, sailed through any seine extended in any of said fisheries, the skipper, captain or other person commanding such vessel, float or boat, shall pay to the owner or occupier of such seine, such damages as shall be ascertained by two respectable and disinterested men mutually chosen by the parties, or if the parties cannot agree upon persons aforesaid, to ascertain the damages, then any Justice of the Peace, on application of either of the parties, shall appoint three disinterested persons with power to any two of the three to ascertain such damages, and any Justice of the Peace of the county where such ascertainment of damages may be made, may enter judgment thereon against the captain or person having charge of such vessel, float or boat, if the sum does not exceed one hundred dollars, and issue execution thereon, as on other judgments; and if the damages exceed one hundred dollars, then the party injured may have an action on said ascertainment of damages in the same manner as if it were an award; and in all cases the damages so ascertained. shall be a lien on such vessel, float or boat.

If over one hundred dollars.

Lien.

Sec. 10. No float or other device for fishing shall be anchored or located at any place so as to interfere with any shore fishery now used as such, or which may hereafter be established, nor shall any seine be hauled from such float or other device over the ground usually hauled over by any shore fishery, and any person violating this section, shall, for each offence, pay a fine of twenty-five dollars, and for every hour such float or other device shall remain thus anchored or located after notice shall be given by the owner or occupier of such shore fishery requiring him to remove, he shall pay an additional fine of twenty-five dollars.

Shall not anchor so as to interfere with shore fishery.

Fine.

Sec. 11. If any person shall wilfully and maliciously put any stake, log, stone or other obstruction in the usual haul of any floating battery, he shall pay a fine of twenty dollars.

Fine for obstructing haul of floating battery.

POTOMAC.

Laws 1870, *Chap.* 205, *Sec.* 12. *This Act repeals Sec.* 12, *Art.* 41, *Code of Public General Laws, and re-enacts the same as below.*

Begin and end.

Sec. 12. The fishing season for Shad and Herring in the waters of the Potomac River shall begin the 15th day of March and end the first day of June in each year.

None save market seine.

Sec. 13. If any person shall haul, drift, anchor or stake in the Potomac River, or any of its tributaries in this State, any gill-nets or seine of any description, (except those commonly called market seines for summer and winter fish, and Sturgeon nets with eight inches mesh,) at any time not within the period fixed by the preceding section, he will forfeit all the boats, seines and fixtures then in his possession, and be fined for each offence, not less than fifty, nor more than one hundred dollars.

Forfeiture and fine.

Sec. 14 *amended by Laws* 1870, *Chap.* 205, *as follows:*

When to fish.

Sec. 14. No person shall haul, drift or fish any seine or gill-net within the water bounds, or berths of any regularly hauled fishing landing, nor opposite to any part of the shore of the owner or occupier of any such landing, within hauling distance from such shore, between the fifteenth day of March, and the first day of June in each year, without the permission of the owner or occupier of such fishing landing, and any person so offending, shall be subject to the forfeiture and fine prescribed by the next preceding section.

Consent of owners.

Sec. 15. The owner or occupiers of the regularly hauled fishing landings are authorized to render any Sheriff or other officer assistance necessary to arrest any person violating any of the provisions of the two preceding sections: and the said officer shall seize all boats, seines, and fixtures in possession of such person, and carry the person so arrested before some Justice of the Peace, to be dealt with as herein directed; and the said officer may summons the posse comitatus to aid him in making arrest or seizure authorized by this article, and may for that purpose also

Owners shall aid Sheriff.

press, at the expense of the State, any steamboat or other vessel belonging to any citizen of this State not actually engaged in carrying the United States mail.

Section 16 *is repealed by Chap.* 72, *Laws of* 1872.

Sec. 17. If any person shall, during the months mentioned in the preceding section, place any boat, vessel or other obstruction or hindrance in the way of laying out or hauling any seine used in any lawful fishery on said river or its tributaries, or otherwise obstruct or hinder such laying out or hauling, and he or his agents shall fail or refuse forthwith to remove such obstruction or hindrance on being required to do so by the person so obstructed or hindered, he shall pay a fine of not less than twenty nor more than one hundred dollars.

Hindering fishing.

Fine.

Sec. 18. If any person shall wilfully and maliciously place any obstruction or hindrance in the way of laying out or hauling in any seine, in any lawful fishery upon the Potomac River, or its tributaries, or in any other manner or way prevent a bona fide owner of a shore, or his agent or tenant, from using or fishing such shore, he shall, on conviction, forfeit and pay not less than fifty dollars, nor more than five hundred dollars, or be imprisoned for not less than one month, nor more than one year; this and the preceding section not to apply to any obstruction or hindrance by unavoidable accident or stress of weather.

Malicious obstruction.

Forfeiture.

Sec. 19. Any owner or occupier of a fishery on the Potomac may cause and permit all vessels employed by him in carrying on his business to be anchored or moved opposite his shore, but not so as to interfere with the rights of the owners or occupiers of adjoining shores in laying out their seines.

Owner of fishery may allow vessel to anchor.

Sec. 20, *Art.* 41, *Code of Public General Laws, is repealed by Chap.* 292, *Laws* 1872.

Sub-Sec. 1. *And be it further enacted*, That sub-section one, of the Code of Public General Laws, title "Fish and Fisheries," sub-title "Potomac," be and the same is hereby repealed, and re-enacted so as to read as follows;

Re-enacted.

Not to catch fish without license.

Not entitled to license.

Sub-Sec. 1. No person shall fish in the Potomac River or its tributaries, for Shad and Herring during the season herein prescribed, with seines, gill-nets or nets of any kind, without having first obtained a license therefor, as hereinafter provided; and no person shall be entitled to obtain such license for fishing with a hauling seine who is not the owner or occupier of some fishing shore on said river, nor shall any be entitled to obtain such license for fishing with gill-nets, except *bona fide* citizens of the counties bordering on said river.

This Act repeals sub-section 1 *of Chap.* 205, *Laws of* 1870, *and re-enacts the same as in the text.*

How to obtain license.

Treasurer to to furnish blank license.

Return to Comptroller.

Sub-Sec. 2. All persons entitled under the laws of this State to fish for Shad and Herring in the Potomac River and its tributaries, shall first obtain a license therefor, by application to the Clerk of the Circuit Court for the county bordering on said river opposite to, or in which he may desire to fish, which license shall have effect for, and during the period hereinbefore fixed; and the Comptroller of the Treasury shall cause to be printed and delivered to the several Clerks of the Circuit Courts for the counties bordering on said river, the requisite number of such blank licenses, and take their receipts for the same as for other licenses furnished; and said Clerks shall, on the first Monday in June in each year, return to the said Comptroller a list and account of such licenses issued by them.

Name and sidence.

Sub-Sec. 3. Every license to fish, as aforesaid, shall state the name and residence of the person to whom the same is granted, the description of the fishing fix to be used, whether hauling seine or gill-net; the number of square fathoms of seine or net when rigged, and that he is the *bona fide* owner of the same, and every person to whom such license may be granted, shall first pay to the Clerk where granted, three cents for each square fathom of seine, and one cent for each square fathom of gill-net to be used; but no license shall be granted to any one applying for the same, unless such applicant shall make oath before the Clerk authorized to issue the same, or before some

Size of seine.

Justice of the Peace of the same county, upon whose certificate the Clerk may issue said license, that the number of square fathoms of the seine or net to be used, and the other facts to be inserted in said license are strictly true, and that he or they will obey and comply with all the provisions of the laws of this State regulating fishing in the Potomac River, and for each and every outfit, whether of hauling seine or gill-net, a license shall be required.

Fishing without license.

Fine.

Sub-Sec. 4. If any person shall fish for Shad or Herring in the Potomac River, or its tributaries aforesaid, without having first obtained a license, as required in the preceding Sections of this Article, except fish caught for private use, and not for sale, he shall, upon conviction thereof, be fined not less than twenty, nor more than one hundred dollars, for the first offence, and for any second or subsequent offence be so fined, or in the discretion of the Justice, or Court before whom tried, forfeit the seine, or net, boat and other outfit used in such fishing; or be both fined, and subject to the forfeiture aforesaid: one-half of such fine to be paid to the informer, and the residue to the Comptroller of the Treasury.

Number of license to be placed on the boat.

Sub-Sec. 5. Every person to whom such license shall be granted, shall also be required to put the number of his license on each bow of his seine or gilling boat, outside, between the waterline and gunwale, to be painted with red oil paint on a white space, and each figure to be not less than three inches in height, and of proportionate width, and any one violating or refusing to comply with this provision, shall on conviction thereof before a Justice of the Peace of the county, in or opposite to which he may be fishing, pay a fine of not less than ten dollars, one-half to be paid the informer, and the residue to the Comptroller of the Treasury.

Without warrant.

Sub-Sec. 6. Upon information given upon oath to any Justice of the Peace having jurisdiction, of any violation of any of the provisions of this Article, he shall issue his warrant for the arrest of the offender, or offenders, and for the seizure of the seines, nets, boats and other fishing outfit in cases when forfeiture of the same is provided which shall be directed to the Sheriff, or any Constable of the county, or other officer authorized to arrest under this Article, to be dealt with according to law. And it shall be the duty of any Sheriff, Constable, or other officer so authorized under said Article, with or without warrant, to arrest any person or persons violating the provisions of this Article, and to seize any such seine, net, boat or other fishing outfit, in cases where forfeiture of the same is provided, and found being used in violating any of said provisions, and to bring such offender or offenders before a Justice of the Peace most accessible or convenient, to be dealt with as herein provided.

Sold by Sheriff.

Sub-Sec. 7. All vessels or other property condemned under the provisions of this Article, shall be sold by the Sheriff, or other officer, making the seizure, on ten days' notice, and the proceeds of sale, after deducting the expenses thereof, shall be paid over to the Clerk of the Circuit Court of the county, to be disposed of as herein provided.

Fines paid into Treasury.

Sub-Sec. 8. All money arising from the sale of licenses, or from fines, penalties and forfeitures imposed under this Article, shall by the Comptroller be paid into the Treasury, and placed to the credit of the Oyster Fund, and the State's portions of such fines and forfeitures shall be paid by the Sheriff or other officer collecting the same, to the Clerk of the Circuit Court of the county where the same may accrue, and such Clerk shall account for the same to the Comptroller of the Treasury in his annual return; and the commanding officer of the "State Oyster Police Force" is hereby charged with the enforcement of the provisions of this Article; and it shall be his duty to enforce the same, as provided in sections twenty-one, twenty-two and twenty-three of the Act of Assembly of eighteen hundred and sixty-eight, Chapter four hundred and six, in regard to Oysters; and the Commissioners of the State Oyster Police Force are hereby constituted also Commissioners of Fisheries in the Potomac River.

Duty of Oyster Police Force.

Not to fish in Potomac river

Sub-Sec. 9. It shall be unlawful hereafter for any person or persons to fish in the Potomac River from what are known as "Arks or Lighters," or from any kind of vessel or float, by whatever name called, in or upon which such persons may live, or may exclusively occupy, but all such fishing shall be with or from regular seine or gilling boats.

Any violation of this section shall subject the offender or offenders, upon conviction thereof, to a fine of not less than twenty nor more than one hundred dollars for the first offence, and for any second or subsequent offence to such fine, and also in the discretion of the Justice of the Peace, or of the Court before whom the offender may be convicted, to forfeiture of such ark, lighter, vessel or float, and fishing outfit, used in such violation thereof.

State of Virginia.

Sub-Sec. 10. In case the State of Virginia shall adopt a law similar in its provisions to this Act, citizens of either State, when arrested for the violation of the provisions of this Article by the police force or other officer of either State, shall be delivered up for trial to the police force, or other officer of the State of which the offender is a citizen, unless arrested for hindrance or disturbance of the fisheries on the shores of the other State, in violation of any of the provisions of this Article, in which case he shall be tried in such other State, and in all questions of citizenship the burden of proof shall be on the offender.

Laws 1865, *Chap.* 185, *Sect.* 21. *This Act repeals Sect.* 21, *Art.* 41, *Code Public General Laws and re-enacts the same as given in the text.*

Not lawful to carry away sand, gravel, &c.

Sec. 21. It shall not be lawful for any person other than the owner, or by the permission of the owner, to take or carry away from any shore of the Potomac River, below Fort Washington, which has been or may be used as a fishery, any sand, gravel or other matter, that may form a part of said shore, to the amount of twenty bushels or more, and if any person shall feloniously steal, take or carry away from any shore of the Potomac River, below Fort Washington, which has been or may be used as a fishery, any sand, or gravel or other matter that may form part of said shore, to the amount of twenty bushels or more, such person shall be deemed guilty of larceny, and on conviction thereof in the Circuit Court of the county in which such larceny was committed, shall pay to the owner the full value thereof, and be sentenced to the Penitentiary for not less than one year, nor more than five years.

PATUXENT.

Laws 1874, *Chap.* 219. *This Act repeals Chap.* 128, *Laws* 1872, *which repealed Sec.* 22, *Art.* 41, *Code Public General Laws, and re-enacts the same with the sub-sections, as given in the Text.*

Not to be lawful.

Proviso.

Sect. 22. It shall not be lawful for any person or persons other than *bona fide* residents, citizens of Prince George's, Charles, St. Mary's and Calvert counties, to take or catch fish in the waters of the Patuxent River and tributaries, with a seine, weir, trap or other device, excepting only the hook and line; provided, that the provisions of this section shall not apply to such as shall obtain permission from the owners of lands bordering on said waters, to fish off and opposite his, her or their land or lands so bordering on said waters; and provided, that none other than *bona fide* residents, citizens of said counties, shall use in any of the waters of said river that bind on Prince George, Charles and Calvert counties, above the village known as Benedict, any seine, weir of not more than seventy fathoms long, and less than two inches square in the mesh.

Smaller fish to be returned to the water.

Sub-Sect. 1. It shall not be lawful for any person or persons to empty their seines upon the beach, so as to leave the smaller fish to perish, but to empty the same in water of sufficient depth, to enable such smaller fish to return to the waters for growth and maturation.

Fine.

Seizure.

Sub-Sect. 2. Any person or persons violating the provisions of this Act, shall be fined not less than twenty-five nor more than one hundred dollars, in the discretion of the Justice of the Peace before whom the case is heard, which amount shall be appropriated to the Public School fund of the county wherein such judgment is rendered; and for the payment of the amount of fine so adjudged, any boat, seine, weir or other fishing tackle used by any person or persons in violation of the provisions of this Act, shall be seized and held as security upon complaint against such offending party.

Laws 1874, *Chap.* 313. *This Act repeals Sec.* 23, *Code Public Genl. Laws, and re-enacts the same as given in the text.*

Sect. 23. No person shall stake down any seine or net across the Patuxent River, for the purpose of taking shad or herring; nor shall any person whip, thrash or beat the water of the Patuxent River with poles or any other instruments, for the purpose of driving fish into any seine or net; nor shall any person in fishing in the said river, between the fifth day of March and the fifteenth day of May, use any seine or net with meshes of less size than one and three-eighths of an inch square: or during the rest of the year with any seine or net with meshes of a less size than two inches square, and no person shall empty any seine except in water twelve inches deep; and any person violating this section shall be subject to the fine and forfeitures provided in the twenty-second section of this Article. Size of seine.

Laws 1874, *Chapter* 80, *add the following sections:*

Sec. 23, A. *Be it enacted by the General Assembly of Maryland*, That no vessel, float, raft or boat of any description, unless compelled to do so by stress of weather or other unavoidable accident, shall be anchored or stayed in the berth or haul of any regularly hauled fishing shore in the Patuxent River, and remain thus anchored for the space of half an hour, when the weather will permit the departure of such vessel, raft, float or boat, after being warned to depart therefrom by the owner or occupant of said fishery. Not to anchor.

Sect. 23, B. *And be it enacted*, That any person violating the preceding section, shall pay to the owner of said fishery a fine of twenty dollars for each offence, and every hour the vessel, float or boat continues after the half hour mentioned in the preceding section, shall be considered a new and separate offence. Penalty for violating.

Sect. 23, C. *And be it enacted*, That the captain or owner of the vessel, float or boat referred to in the two preceding sections, shall be liable to pay said fine, and the vessel, float or boat so anchored and stayed as above mentioned, shall also be liable to be seized and sold to pay any fines imposed under the preceding sections. Liable.

Sect. 23, D. *And be it enacted*, That if any such vessel, float or boat shall be willingly, wantonly and maliciously, or from gross negligence sailed through any seine extended in any of said fisheries, Not to sail through.

the skipper, captain or other person commanding such vessel, float or boat, shall pay to the owner or holder of such seine, not less than twenty, nor more than one hundred dollars, at the discretion of the Justice of the Peace trying the case.

Not to obstruct.

Sect. 23, E. *And be it enacted*, That if any person shall wilfully and maliciously put any stake, log, stone, ballast or other obstruction in the berth or haul of any fishery, he shall pay a fine of not less than twenty, nor more than one hundred dollars, at the discretion of the Justice of the Peace trying the case.

Laws 1870, *Chapter* 235, *enact the following sections:*

Stationary weir may be abated.

Sect. 1. *Be it enacted by the General Assembly of Maryland*, That all stationary or permanent weirs or hedges in the Western Branch of the Patuxent River, or on the Eastern Branch of the Potomac River, and its tributaries, in Prince George's county, are declared nuisances, and may be abated as such by any person.

Forfeiture.

Sec. 2. *And be it enacted*, That if any person shall place or make any stationary or permanent weir or hedge in the said branches, or their tributaries, contrary to the provisions of the preceding section, he shall forfeit the sum of twenty-five dollars, to be recovered before any Justice of the Peace of said county, one-half to the informer or person who may sue for the same, the other half to be paid to the Justice of the Peace, and by him paid to the School Commissioners of said county for the use of the public schools.

Forfeiture.

Sec. 3. *And be it enacted*, That if any person shall fish any such weir or hedge, he shall for every offence, forfeit the sum of fifteen dollars, to be recovered and applied as in the preceding section.

RIVERS IN TALBOT, DORCHESTER, AND CAROLINE COUNTIES.

None save residents.

Sec. 24. No person shall take or catch fish in the waters of Talbot, Dorchester or Caroline counties, except the citizens of said counties, and except such residents of this State as may obtain the permission of the owner or occupier of land bordering on any of the said waters; *Provided*, that any person so obtaining permission shall not employ in his service any other than a *bona fide* resident of this State.

Sec. 25. Any person violating the preceding section, shall pay a fine of not less than five nor more than fifty dollars, and forfeit the boat or vessel in his possession, together with the seine, tackle, and all things on board at the time the offence may be committed.

Forfeiture.

WYE RIVER, AND THE RIVERS IN QUEEN ANNE'S AND KENT COUNTIES.

Sec. 26. If any person shall haul a seine in Wye River, or any of the rivers of Queen Anne's or Kent counties, without the permission of the owner or occupant of the shore where such seine may be hauled, such owner or occupant may seize by way of distress the seine, boat, tackle and everything on board the boat, and may have the damages sustained by him, by reason of such hauling of a seine, ascertained by a Justice of the Peace, or by three citizens to be summoned and sworn by a Justice of the Peace, and when the damages are so ascertained, the owner or occupant of such shore may have the seine, boat and articles so distrained, appraised, and sold to pay such damages.

Owner may seize seine.

Sec. 27. All fines and penalties imposed by the preceding sections of this Article, if they do not exceed one hundred dollars, may be recovered by action of debt in the name of the State before a Justice of the Peace, and if over one hundred dollars, by indictment in the Circuit Court for the county where the offence is committed.

Mode of recovering fine.

Sec. 28. If the name of the offender be unknown, he may be arrested on a warrant describing him as the person committing the offence, without stating his name in the warrant.

Warrant where offender is unknown.

Sec. 29. All forfeitures of property incurred under this Article may be enforced in this way: the Sheriff or Constable shall, on complaint made to him, seize the property alleged to be so forfeited, and give notice to the owner thereof, if

Seizure.

the owner can be found, to appear before a Justice of the Peace of the county where the seizure is made, on a certain day within five days from time of seizure to show cause why the property so seized should not be condemned; and if the owner of the property so seized evades the service of said notice, then the Sheriff or Constable may set up notices at three of the most public places in the neighborhood of the seizure, warning the owner of such property to appear before a Justice of the Peace to be therein named, on a certain day, not less than ten days from the time of seizure, to show cause why the said property could not be condemned.

Condemnation.

Sec. 30. If upon the hearing in any case of seizure as aforesaid the Justice is satisfied that the owner or person having charge of the property so seized is guilty of violating any of the provisions of this Article which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, (or if he be dead or removed away, by some other officer,) on ten days' public notice; and the Justice may proceed ex parte to hear and determine any question of forfeiture, if the owner fails to appear after the notice herein required to be given.

Condemnation where offender is unknown.

Sec. 31. If the Sheriff or Constable making a seizure of property under this Article does not know the name of the owner or person having charge thereof, he may describe him in the notice he is required to give as the owner of the property, without naming him, and the Justice, if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Proceeds of sale, how divided.

Sec. 32. The proceeds of the sale of any property forfeited as aforesaid shall, after paying the expenses of the seizure, condemnation and sale, be divided, one-half to the Sheriff or Constable making the seizure, and the other half to the informer.

Fines how appropriated.

Sec. 33. All fines imposed under this Article shall go, one-half to the informer and the other half to the county where the fine is imposed.

Jurisdiction.

Sec. 34. If any offence under this Article is committed in a river dividing two counties, then the Justice or Court of either county shall have jurisdiction, or if it is committed in the waters of the Chesapeake Bay, then the Justices or Courts of any counties bordering on that part of the Bay shall have jurisdiction.

Commitment where fine is over $100.

Sec. 35. If any person is arrested for any offence under this Article, and the fine is more than one hundred dollars, then the Justice before whom such person is brought shall commit such person, unless he gives adequate bail to appear and answer such offence, at the next Circuit Court for the county.

Laws 1864, *Chap* 71, *add the following sections:*

Relating to fish.

Sec. 36. It shall not be lawful for any person or persons to whip or beat the water in that part of the Potomac River, lying between the mouth of New Creek and Weaverton dam, with poles, sticks or other things for the purpose of driving the fish into nets, seines, fish-baskets, or other seines, or to erect any fish-pot, or to fish with any drag-net, fish-basket or other snare, or in any other manner, except with the gig, trot-lines, dip-net or the angling-rod.

Penalty.

Sec. 37. Any person or persons offending against the provisions of the last preceding section, shall forfeit and pay for each offence, the sum of thirty dollars, to be recovered in the name of the County Commissioners of the county in which the offence takes place, before a Justice of the Peace, one-half to the informer, and the other half to the school fund of the county, and in such action the informer shall be a competent witness.

Justices of the Peace to account.

Sec. 38. Every Justice of the Peace shall annually account with the County Commissioners of his county, at the meeting to make the county levy, for all fines received under this Act, under the penalty of fifty dollars for each fine, by him imposed or received.

PATAPSCO RIVER.

Laws 1874, *Chapter* 79, *enact the followng sections:*

Not lawful

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons, to take, capture or destroy fish, by seine or seines, drag-net or drag-nets, set-net or set-nets, dip-net or dip-nets, stir-net or stir-nets, fish-baskets or fish-pots, eel-weirs, brush or fascine-nets, or any means or contrivances whatever of the nature of a seine, which are known to destroy or capture fish, or to destroy or capture them by shooting or striking through the ice, or otherwise than by hook and line, commonly known as angling. in the Patapsco River above tide-water.

Fish-ladders.

Sec. 2. *And be it enacted*, That the owner or owners of all dams, erected now or hereafter on said river, shall, and are hereby required to make or cause to be made, and keep in repair, proper fish ladders, and have them placed on said dam, so as to afford to the fish, in said river, free course up and down said river.

Penalty for failure.

Sec. 3. *And be it enacted*, That if the owner or owners of the aforesaid dams fail to comply with the provisions of the preceding section, within sixty days from the passage and approval of this Act, they, or either of them shall be liable, upon conviction thereof, by summary process before any Justice of the Peace of this State in the county nearest or adjacent to where the dam or dams are situated, to a penalty of not less than fifty nor more than one hundred dollars, five dollars to the informer, and the balance to the Board of County Commissioners of the counties adjacent to said dam or dams for school purposes.

Penalty for violating first section.

Sec. 4. *And be it enacted*, That any person or persons offending against the provisions of the first section thereof, shall be liable, upon conviction thereof by summary process before any Justice of the Peace of this State, in and for the county where the act is committed, to a penalty of not less than ten nor more than thirty dollars, one-third to the informer, one-third to the Constable making the arrest, and the balance to the Treasurer of the Board of County School Commissioners, for school purposes, provided that any person or persons so offending, on conviction thereof as aforesaid, who shall refuse or fail to pay said fine imposed, and the cost thereon, such person or persons shall be imprisoned in the County Jail, where the act shall be committed, for not less than ten, nor more than twenty days.

Appeal.

Sec. 5. *And be it enacted*, That any person or persons who may feel himself or themselves aggrieved by any judgment, rendered by a Justice of the Peace, under the provisions of this Act, shall have the right to appeal to the Circuit Court of the county where the act was committed, upon the conditions and subject to the regulations now provided by the general law regulating appeals from Justices of the Peace, but execution of the judgment of the Justice of the Peace shall not be stayed, unless the party appealing shall give bond to the State for double the amount of fine imposed, with security approved by the Justice rendering the judgment, with condition to prosecute his appeal with effect, or to pay the fine imposed with all costs.

Expires April, 1876.

Sec. 6. *And be it enacted*, That this Act shall take effect from the date of its passage and continue in force until the first day of April, eighteen hundred and seventy-six.

POCOMOKE.

Laws 1862, *Chapter* 171, *enact the following sections:*

Fish in Pocomoke River, provision for their protection.

Sect. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person to throw or place in the waters of the Pocomoke River, for the purpose of taking or destroying fish therein, any lime, coculus indicus, otherwise called Indian or Indian coculus, or any other poisonous weed or substance, whether the same is mixed with any other substance or not; every person so offending, shall be deemed guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace in the name of the State, such person shall be punished by fine in the discretion of the Justice, of not less than five, nor more than twenty-five dollars, to be collected by any Constable in the district where such offence may have been committed, in the same manner of other small debts; one-half of said fine shall be paid to the informer, and the other half into the Public School Fund of Worcester county; *provided*, that nothing herein contained shall be intended to apply to any of the waters of said river, below a point called and known by the name of Porter's Bridge. Proviso.

Sect. 2. *Be it enacted*, That any person deeming himself or herself aggrieved by any judgment of the Justice of the Peace under this Act, shall be entitled to an appeal to the Circuit Court of the county, as in other cases of appeal from judgments of Justices of the Peace. Appeal.

Laws 1874, *Chapter* 253, *enact the following sections*:

Sect. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person to take, catch or kill any speckled brook trout, or any speckled river trout, save only with a hook and line, or to have any such trout in his or her possession, except during the months of April, May, June, July and the first fifteen days in the month of August, under a penalty of five dollars for each trout so caught or had in his or her possession: but this section shall not prevent any person or corporation from catching trout in any manner or at any time, in waters owned by them, or upon their premises to stock other waters. Trout only to be taken with hook and line.

Sect. 2. *And be it enacted*, That it shall not be lawful for any person within the State of Maryland to take or catch any brook trout at any time, in any of the waters of the State, by means of any fish-basket, seine or seines, net or nets, trap or traps, under a penalty of five dollars for each and every fish so taken. Penalty.

Sect. 3. *And be it enacted*, That no person shall place in any fresh-water stream, lake or pond, without the consent of the owner, or in the waters and estuaries with the rivers debouching into them, any lime or other deleterious substance, with the intent thereby to poison or catch fish, under a penalty of one hundred dollars. Shall not place lime, &c., in any stream. Penalty.

Sect. 4. *And be it enacted*, That whenever any person who owns, controls or erects an artificial pond upon his own land, or land of which he is in legal possession, and shall put therein any fish or the eggs or spawn of fish, for the purpose of breeding and cultivating fish, and shall give notice thereof, either in one or more newspapers of the county, or by written or printed handbills put up in public places near said pond, any person who shall thereafter enter upon such premises for the purpose of fishing, or shall catch in said pond or ponds, and take therefrom any fish, shall be guilty of a trespass, and in addition thereto, shall be liable to a penalty of five dollars for the first fish, ten dollars for the second, and twenty dollars for the third and each subsequent offence; provided that this Act shall not prevent the owner of such pond or ponds, or any one by his authority, from catching or taking fish therefrom.

Breeding fish.

Penalty for taking.

Sect. 5. *And be it enacted*, That any person or company engaged in the increase of brook trout by artificial process, (known as fish culture,) may take from his or their pond or ponds in any way, and cause to be transported, and may sell any brook trout, and the spawn of brook trout at any time, and common carriers may transport them, and dealers may sell them, on the condition, that the packages thereof so transported, are accompanied by a certificate from a Justice of the Peace, certifying that such trout are sent by the owner or owners, or agents of parties so engaged in fish culture; and such person or company may take in any way, and at any time, upon the premises of any person, under permission of the owners thereof, brook trout to be kept and used for artificial propagation only, and for no other purpose.

Persons engaged in fish culture may sell.

Sect. 6. *And be it enacted*, That violation of any of the provisions of this Act contained, may be prosecuted by any citizen of the county in which said violation shall take place, before any Justice of the Peace or Circuit Court for said county, the informer to be a competent witness; funds paid as penalties shall be equally divided between the informer and the Public School Commissioners of the county, for the benefit of the Public Schools in the district where the offence is committed.

Any citizen may prosecute

Laws 1874, *Chapter* 150, *enact the following section:*

Appointment of Commissioners of Fisheries.

Sect. 1. *Be it enacted by the General Assembly of Maryland,* That the Governor, by and with the advice and consent of the Senate, is hereby authorized to appoint two competent persons, who shall continue in office for two years from the time of their appointment, and until their successors are appointed, who shall be known as Commissioners of Fisheries of Maryland, and that one of the Commissioners shall come from the Eastern, and one from the Western Shore of the State.

Duties of.

Report.

Sect. 2. *Be it enacted,* That it shall be the duty of said Commissioners to immediately proceed to inspect all the waters of this State, with a view of stocking the same with such food fishes as in their judgment shall be most advantageous, and with such object shall communicate with the Commissioner General of Fisheries of the United States, and with the Commissioners of Fisheries appointed by the different States, and report the result of their inspection to the Governor of this State, as soon as practicable, and that they examine into the feasibility of cutting a channel around the Great Falls of the Potomac, to admit the passage of fish from tide-water into the Upper Potomac, and that they also inquire into the expediency of constructing fish-ways or fish-ladders to admit the passage of fish over dams or other obstructions in the Upper Potomac, or elsewhere in the State, and that an estimate of cost be made, and a report thereof be made to the next General Assembly of Maryland.

The appointment of two Commissioners had been previously authorized, Chapter 297, *Laws* 1870, *but the Act had expired by its own limitation.*

Duty of

To obtain ova and construct houses for hatching, &c.

Sec. 3. *Be it enacted,* That it shall be the duty of the said Commissioners of Fisheries, after making the inspection and obtaining the information required in the preceding section, to proceed to the selection of proper locations for the propagation and culture of such food fishes as it shall be deemed desirable to introduce into the waters of this State, and obtain the necessary ova, and construct and erect suitable houses and devices for hatching the same, and protecting the small fish, until fit to be distributed, and then to distribute the same among such waters of this State as shall be deemed proper.

Sec. 4. *Be it enacted*, That it shall be the duty of the said Commissioners to make an annual report to the Governor, for transmission to the General Assembly of the State, of the work accomplished by the Commission, and also embracing such suggestions of food fishes in the waters of this State, as may be the result of their observation and experience; *provided*, that nothing in this Act shall interfere with any existing rights of catching fish in the waters of this State.

To make annual report.

Proviso.

Sec. 5. *Be it enacted*, That the salaries of said Commissioners, shall be fifteen hundred dollars per annum each, and that the sum of three thousand dollars per annum, be and the same is hereby appropriated to pay the said salaries.

Salaries of

Sec. 6. *Be it enacted*, That the further sum of thirty-five hundred dollars per annum, or so much thereof as may in the opinion of the Governor, be necessary, be and the same is hereby appropriated for the purpose of carrying out the provisions of this Act, and the Comptroller shall issue his warrant on the Treasurer for the payment of the said sum, on presentation of the accounts of the said Commissioners, approved by the Governor, out of any monies in the Treasury, not otherwise appropriated.

Appropriation

Public Local Laws

ON

FISH AND FISHERIES.

4

FISH AND FISHERIES.

Public Local Laws.

ANNE ARUNDEL COUNTY.

Code Public Local Laws, Art. 2.

Sec. 98. It shall not be lawful for any person to use in the rivers or waters of Anne Arundel county, any seines or nets, the meshes of which shall be less than one inch and a quarter square, except such seines or nets, as do not exceed ten fathoms in length. Size of lawful seine.

Sec. 99. If any person shall use or haul in the rivers or waters of said county, any seine or net exceeding ten fathoms in length, the meshes of which shall be less than one inch and a quarter square, he shall forfeit and pay for each offence, the sum of twenty dollars, to be recovered in the name of the State, before any Justice of the Peace, as other small debts; one half to the use of the informer, and the other half to the use of the State. Penalty.

Laws 1870, *Chapter* 408, *enact—*

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons, except *bona fide* residents of the State of Maryland, to set nets or haul seines in any of the rivers, creeks or coves lying in Anne Arundel county. Must be residents.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons except *bona fide* residents of the State of Maryland, to take or catch terrapins or crabs in any of the rivers, creeks, or coves lying in said county.

Sec. 3. *And be it enacted*, That any person violating the provisions of either of the preceding

Penalty.

sections of this Act, shall pay a fine of not less than five, nor more than fifty dollars, and forfeit the boat or boats and vessels in his possession, together with the seine or seines, tackle and all things on board at the time the offence may have been committed.

Sheriff to arrest.

Condemned.

Sec. 4. *And be it enacted,* That it shall be the duty of the Sheriff, or any Constable, on complaint made to him to arrest any person or persons, so violating the foregoing sections of this Act, and to seize the boat or boats and vessels, together with the seine, tackle and all things on board, alleged to be forfeited, and give notice to the owner or owners thereof, if the same can be found, to appear before a Justice of the Peace of Anne Arundel county on a certain day, within five days from the time of seizure, to show cause why the property so seized should not be condemned, and if the owner or owners of the property so seized evade the service of the notice, or cannot be found, then the Sheriff or Constable may give notice by publication in some newspaper published in Anne Arundel county, or may set up notices at three of the most public places in the neighborhood of the seizure, warning the owner or owners of such property to appear before a Justice of the Peace of said county to be therein named, on a certain day, not less than ten days from the time of the seizure, to show cause why the said property shall not be condemned.

Publish notice

Judgment of Justice.

Sec. 5. *And be it enacted,* That if, upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner, or person or persons having charge of the property so seized, is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, after ten days public notice, and the Justice may proceed *ex parte* to hear and determine any question of forfeiture; if the owner or owners fail to appear after the notice herein required to be given, and in all cases arising under this Act, an appeal may be had to the Circuit Court for Anne Arundel county, subject to the same laws and rules that govern in other cases of appeal from the decision of Justices of the Peace.

Failing to appear.

Describe if not known.

Sec. 6. *And be it enacted*, That if the Sheriff or Constable making the seizure of property under this Act, does not know the name of the owner or person having charge thereof, he may describe him in the notice he is required to give, as the owner of the property without naming him, and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Appropriation of fines.

Sec. 7. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid with all fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided, one-fourth to the Sheriff or Constable making the seizure, one-fourth to those aiding in making the arrest and seizure, and the remaining one-half to the Board of School Commissioners for Anne Arundel county, for the use of the primary schools of said county.

BALTIMORE COUNTY.

Code of Public Local Laws, Art. 3.

Quick lime.

Sec. 109. No person shall destroy the fish in any branch or creek in Baltimore county, by putting quick lime therein, under the penalty of twenty dollars for each offence, to be recovered before a Justice of the Peace of said county, one-half to the informer, and the other half to the use of the county.

Penalty.

Forfeiture.

Sec. 110. Any master or overseer, wilfully suffering any servant or slave under his management, to put quick lime in any stream of water in said county, shall forfeit the sum of twenty dollars, to be recovered and applied as directed in the preceding section.

Sect. 111 *seems to be repealed by Art.* 26. *Declaration of Rights, Const. Md., p.* 18.

Laws 1874, *Chapter* 348, *enact*—

Not be lawful.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons to take, capture, or destroy fish by seine, drag-net, set-net, stir-net, fish-baskets or fish-pots, weirs or any means or contrivances whatever of the nature of a seine, which are known to destroy or capture fish, or to destroy or capture them by shooting or striking them on the ice, one mile above tide-water within the limits of Baltimore county, in this State; *Provided*, that it may be lawful to fish in anyway in any of the said tributaries one mile above the mouth of said tributaries.

Offending.

Sec. 2. *And be it enacted*, That any person or persons so offending against the provisions of the preceding section, shall be liable upon conviction thereof, by summary process, before any Justice of the Peace of this State, in and for Baltimore county, to a penalty of not less than ten nor more than thirty dollars; one-third to the informer, one-third to the Constable who may make the arrest, and the balance to the Treasurer of Baltimore county, to be applied to road and bridge purposes; *Provided*, that any person or persons so offending, on conviction thereof, as aforesaid, who shall refuse or fail to pay said fine imposed, and the cost thereon, such person or persons shall be imprisoned in the county jail of the county aforesaid for not less than ten nor more than twenty days.

Duty of Sheriff.

Sec. 3. *And be it enacted*, That it shall be the duty of the Sheriff, Deputy-Sheriff or Constable to whose attention a violation of the provisions of this Act is called, at once to report the same to a Justice of the Peace, and upon warrant being issued, to arrest the offender or offenders, and bring him or them before said Justice for trial; any Constable who fails so to report a case of offence, with the name of the informer, under this Act, when notified as aforesaid, shall himself be liable to a penalty of ten dollars, to be recoverable as like penalties are now recoverable.

Appeal.

Sec. 4. *And be it enacted*, That any person or persons who may feel himself or themselves aggrieved by any judgment rendered by a Justice of the Peace, under the provisions of this Act, shall have the right to appeal to the Circuit Court for Baltimore county, upon the conditions and subject to the regulations now provided by the general law regulating the appeals from Justice of the Peace; but the execution of the judgment of the Justice of the Peace shall not be stayed, unless the party appealing shall give bond to the State for double the amount of the fine imposed, with security approved by the Justice rendering the judgment with condition to prosecute his appeal with effect, or to pay the fine imposed with all costs.

CAROLINE COUNTY.

Laws 1874, *Chapter* 466, *Sects.* 2 *and* 3, *of this Act, repeal Sections* 90 *and* 91, *of the Code of Public Local Laws, and re-enact the same as given in the text.*

Sec. 2. *And be it enacted*, That it shall not be lawful for any person with the exception of *bona fide* resident voters of Dorchester, Talbot and Caroline counties, and they shall first obtain permission of the occupants or owners of lands bordering on said waters, of said counties heretofore named, to take or catch fish in the waters of said counties, with seines, with meshes of less size than five inches square. Not be lawful.

Sec. 3. *And be it enacted*, That it shall not be lawful for any person to empty their seines in water less than twelve inches deep; and all persons violating the two preceding sections of this Act, in either of the aforesaid counties, shall upon conviction thereof before a Justice of the Peace, in the county where the offence shall be committed, be fined not less than five, nor more than fifty dollars, or shall be subject to a forfeiture of the same the boat and appurtenances thereunto belonging, in the discretion of the said Justice: *provided*, that an appeal to the Circuit Court may be taken at any time within ten days from the rendering of such judgment under bond and approved security. Not be lawful. Penalty.

Sec. 92. Any Justice of the Peace of the said county, may issue his warrant, directed to the Sheriff or any Constable of the county, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt shall fine him not less than five nor more than fifty dollars, and shall also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used in violation of said sections, and all the furniture, tackle and apparel, and all things on Penalty.

board at the time of the seizure, and shall direct the Sheriff or Constable to sell the same to the highest bidder after ten days notice at two of the most public places in the neighborhood.

Appropriation of fines.

Sec. 93. After the payment of the costs of prosecuting the offending party, the proceeds of the fine and sale of the boat and other articles condemned shall be apportioned in the following manner: one fourth to the Sheriff or Constable making the arrest and seizure, and the residue amongst those whom he may have summoned, and who have aided in the same, to be determined and awarded by the Justice of the Peace.

Appeal

Sec. 94. Any person aggrieved by any judgment rendered against him by any Justice under this law, may appeal therefrom to the Circuit Court of Caroline county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases.

Penalty.

Sec. 95. If any free person shall whip or beat the water in Great Choptank River, with poles or sticks or other things for the purpose of driving the fish in that part of the river between the Stock Landing and Blade's Overgrowing, during the months of March, April and May, in any year, he shall forfeit and pay for each offence the sum of sixty dollars, to be recovered by action of debt, or bill of indictment, either in the county where the offence was committed or where the person offending shall reside, one half to the informer or person suing for the same, the other half to the use of the county in which he shall be convicted.

Section 96, *is repealed by Article* 24, *Declaration of Rights, Const. Md., Page* 18.

Justice must account.

Sec. 97. Every Justice of the Peace shall annually account to the County Commissioners of said county, for all sums of money received by virtue of this law, under the penalty of twenty dollars.

CECIL COUNTY.

Public Local Laws, Article 8.

Sec. 98. The County Commissioners of Cecil county shall appoint annually a Constable in the district adjoining the Bald Friar Ferry, on the Susquehanna River, whose duty it shall be to examine every fish-pot erected in the river at least once a week in the season the young shad usually descend the river, and if he find any fish-pot or net erected in the river within the limits of Cecil county, wherein the bottom slats shall be more than one and a half inches wide, or placed together closer than three quarters of an inch. or not rounded on the top part, or with the bottom thereof covered with a basket, or any other device so as to close the opening therein, whereby the young shad may be destroyed, he shall give notice thereof to any Justice of the Peace of the county, who shall upon such information of said Constable, or of any other person on oath, issue his warrant to apprehend such owner, and take him before some Justice of the Peace of the county, and he shall, by the Justice before whom he may be taken, be compelled to enter into recognizance for his appearance at the next term of the Circuit Court for Cecil county. Duty of Constable.

Sec. 99. The person so arrested shall be proceeded against by indictment in the Circuit Court aforesaid, and upon conviction or confession of the offence charged, shall be fined by the Court not exceeding sixty dollars for any such offence, one-half to the Constable aforesaid, or such other person as shall prosecute for the same, the other half to the use of the county. Fine.

Sec. 100. The said Constable, for the discharge of the duties aforesaid, and upon his making oath thereto, shall be allowed by the County Commissioners the sum of sixteen dollars per annum. Pay of Constable.

Laws 1870, *Chap.* 165, *enact—*

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons to whip or beat the waters of Mill Creek, or the waters of Principio Creek, in Cecil Not to catch fish.

county, with poles, sticks or any other thing, for the purpose of driving fish into seines, nets, fish-baskets, or any other contrivance for catching fish.

Penalty. Sec. 2. *And be it enacted*, That any person or persons violating the provisions of the preceding section of this Act, and who shall be convicted before a Justice of the Peace of Cecil county, for the same, shall forfeit the boats, nets, seines and other fixtures used by such offender or offenders at the time of so violating the same; and the proceeds of the sale of such forfeited property or fixtures, after deducting the costs of prosecution, shall be paid, one-half to the informer and the other half to the School Commissioners of Cecil county, for the benefit of the Public Schools of said county.

Laws 1874, *Chapter* 388, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That no person or persons shall fish at any time in the waters of the Elk River and North East River and their tributaries, lying and being within the limits of Cecil county, with any hauling seine of any description, the meshes of which are of less measure than what is generally known as "inch and a quarter mesh." Prohibited.

Violating. Sec. 2. *And be it enacted*, That any person or persons violating the provisions of this Act, upon conviction thereof before any Justice of the Peace in Cecil county, shall pay a fine of twenty dollars, and forfeit such seine, and the boats and materials used in fishing the same, which shall be sold at public auction for cash, one-half of said fine and the proceeds of said sale shall go to the officer making the arrest, and the other half to the Public School fund of said county.

CHARLES COUNTY.

Laws 1872, *Chapter* 198, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons, except *bona fide* residents of Charles county, to take or catch terrapins, or to haul a seine in any of the inlets or tributaries of the Potomac River, lying in Charles county, nor within five hundred yards of the beach on the Potomac

River, between Maryland Point in Charles county and Chiseldine's Island in St. Mary's county, nor in the Wicomico river: *provided*, that persons owning or occupying lands on the Wicomico River or on the Potomac River, or any tributaries thereof in Charles county, shall have the right to rent or otherwise grant to non-residents of the county the privilege of fishing on their shores, or within the prohibited line on their water-front; *provided further*, that any land owner desiring or intending to rent or grant the privilege to fish on his water-front, shall ascertain and distinctly mark the line dividing his land and water-front, from that of the adjoining land owner; and the manner of making said dividing line, shall be by fixing a substantial stake or buoy, immediately on his dividing line, five hundred yards from the beach, and another in the same line, half way between the beach and the outer stake or buoy: and where the water-front is on a creek, the centre of the creek shall be marked in a similar manner, to prevent an infringement on the rights of persons owning the opposite shore.

Proviso.

Non-resident not to take or catch terrapins.

Further proviso.

Sec. 2. *And be it enacted*, That no person or persons shall haul a seine more than eighty fathoms in length in that portion of the Potomac River, between Maryland Point, in Charles county, and Chiseldine's Island, in St. Mary's county, except from the fifteenth day of March to the first day of June, inclusive.

Time in which persons may haul seine.

Sec. 3. *And be it enacted*, That any person or persons violating the provisions of either of the preceding sections of this Act, shall pay a fine of not less than five, nor more than fifty dollars, and forfeit the boat or boats, and vessel in his or their possession, together with the seine or seines, nets, tackle and all things on board, or in anywise pertaining thereto, at the time the offence may have been committed, and in case any person or persons are charged with the violation of any of the provisions of this Act, the burden of proof of evidence shall be upon the person or persons so charged.

Persons violating this Act to pay fine, &c.

Sec. 4. *And be it enacted*, That upon information given upon oath to any Justice of the Peace of the county of Charles, of any violation of any of the provisions of this Article, he shall issue his warrant for the arrest of the offender or offenders, which shall be directed to the Sheriff or any Con-

Justice of the Peace to issue warrant for the arrest of.

stable of the county, to be dealt with according to law, and in such warrant it shall not be necessary to name any such offender or offenders, or the owner of any such property, but it shall be sufficient to describe them or him as persons, or a person guilty of violating the law without naming such person or persons.

Arrest without warrant.

Sec. 5. *And be it enacted*, That it shall be lawful for any citizen or citizens, and it shall be the duty of the Sheriff or any Constable of the said county of Charles to arrest with or without warrant, any person or persons violating the foregoing sections of this Act, and to take them before some Justice of the Peace of the county for trial under this Act, and to seize the boat or boats and vessel, together with the seines, nets, tackle and all things on board, or in anywise pertaining thereto, used in such violation as aforesaid, and give notice to the owner or owners thereof, if the same can be found, to appear before a Justice of the Peace of Charles county on a certain day, within five days from the time of seizure, to show why the property so seized should not be condemned, and if the owner or owners of the property so seized, evade the service of said notice or cannot be found, then the Sheriff or Constable, or citizen or citizens making arrest, may give notice by publication in some newspaper published in Charles county, or may set up notice at the most public places in the *neighborhood* of the seizure, warning the owner or owners of such property to appear before a Justice of the Peace of Charles county to be therein named, on a day certain, not less than ten days from the time of seizure, to show cause why the said property should not be condemned.

Satisfied of the guilt.

Sec. 6. *And be it enacted*, That if upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner or person or persons having charge of the property so seized is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, after ten days public notice, and in case such seizure shall be made by any citizen or citizens other than the Sheriff or a Constable, then the sale of the property so seized shall be sold on ten

Condemned and sold.

days' public notice by the Sheriff or any Constable the said Justice may designate, and if the owner or owners fail to appear after the notice herein required to be given, the Justice shall proceed *ex parte* to hear and determine any question of forfeiture, and in all cases arising under this Act there shall be an appeal to the Circuit Court for Charles county, subject to the same law and rules that govern in other cases of appeal from the decisions of Justices of the Peace.

Proceed *ex parte.*

Sec. 7. *And be it enacted*, That if the Sheriff or Constable, or any citizen or citizens, as prescribed in the first section, making seizure of property under this Act, does not know the name of the owner or person having charge thereof, he or they may describe him in the notice required to be given as the owner of the property without naming him and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Name not known.

Sec. 8. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid, with all costs of prosecution and fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided one-fourth to the Sheriff or Constable making the seizure, *one-fourth* to those aiding in making the arrest and seizure, and in case the arrest and seizure is made without the aid of an officer, then one-half to those making the arrest and seizure, and in all cases, one-half to the County Commissioners of Charles county, to be expended in repairing the public roads of said county, and in default of the payment of such fines and costs of arrest and prosecution, the person or persons convicted of the violation of any of the provisions of this Act, shall be committed to the county jail for thirty days, unless such fine and costs be sooner paid.

Disposition of proceeds of sale.

Sec. 9. *Be it enacted*, That any person who shall attempt to violate any of the provisions of this Act, shall be guilty of a misdemeanor, and on conviction thereof, shall be dealt with and punished as if he had violated said Act; and the finding of any non-resident of the county upon any of the tributaries of the Potomac River.

Conviction of party attempting to violate.

lying wholly, or in part in Charles county, (save as herein excepted,) having in his possession any seine, net, tackle or other contrivance generally used in taking terrapins, or in hauling seines for fish, shall be *prima facie* evidence of such attempt by such person.

Sec. 10. *And be it enacted*, That nothing contained in this Act, or in the [the] Act passed January Session, eighteen hundred and seventy, chapter sixty-one, shall be construed to prohibit the citizens of Charles and St. Mary's counties, having a common right to fish in that inlet or tributary of the Potomac River, commonly called Wicomico River, save as may conflict with section one of this Act, where shores are distinctly marked and designated as therein required.

DORCHESTER COUNTY.

Code Public Local Laws, Article 10.

Sections 2 *and* 3, *Chapter* 466, *Laws* 1874, *the provisions of which have been given above under the head of Caroline County, now constitute Sections* 113 *and* 114 *of this Article.*

Penalty.

Sec. 115. Any Justice of the Peace of said county may issue his warrant, directed to the Sheriff or any Constable of the county, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt shall fine him not less than five nor more than fifty dollars; and shall also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used by such person, and all the furniture, tackle and apparel, and all things on board at the time of her seizure: and shall direct the Sheriff or Constable to sell the same to the highest bidder for cash, after ten days notice at two of the most public places in the neighborhood.

Apportionment of penalties, fines and forfeitures

Sec. 116. After the payment of the costs of prosecuting the offender, the proceeds of the fine, and the sale of the boat and other articles condemned. shall be apportioned in the following manner:— One-fourth to the Sheriff or Constable making the arrest and seizure, and the residue among those whom he may have summoned, and who may have aided in the same to be determined and awarded by the Justice of the Peace.

Sec. 117. Any person aggrieved by any judgment rendered against him by any Justice, under the 115th Section of this Article, may appeal therefrom to the Circuit Court for Dorchester county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases. Appeal.

Laws 1872, *Chapter* 170, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any non-resident of the State, to take or catch fish in any manner or way, in the waters of the Nanticoke River, without first obtaining from the Clerk of the Circuit Court of either Wicomico or Dorchester counties, a license therefor, which license shall be granted upon paying twenty dollars to said Clerk for the use of the State of Maryland; said license shall be in force for one year from date of granting, and shall be confined to one boat or vessel therein named. Any person not a resident of the State, violating this section, shall, upon conviction before any Justice of the Peace of the State of Maryland, be subject to a fine of not less than fifty or not more than one hundred dollars, and forfeit the boat or vessel, and all nets, seines or tackle so used in taking fish; the proceeds of said fine and forfeited property, after paying officers' fees, to be paid to the Clerk of the Circuit Court of the county where tried, for the use of the State. Not lawful without License.

Sec. 2. *And be it enacted*, That upon information of any person made to any Justice of the Peace of either of said counties, the said Justice shall issue his warrant to some Constable or Sheriff, for the arrest of said persons violating the preceding section, and have the said person or persons brought before him for trial. Warrant.

Sec. 3. *And be it enacted*, That any party or parties, against whom any Justice of the Peace may render a judgment under this Act, either to pay a fine or of condemnation of property, may at any time within ten days from the rendition of such judgment, appeal from such judgment to the Circuit Court of said counties respectively; but no execution or sale shall be stayed unless the party Appeal.

May appeal appealing shall give bond, with security, to the State of Maryland, in double the value of property condemned, or of the fine imposed, as the case may be; said security or securities to be resident or residents of the State, and who shall swear or affirm that he or they are worth double the amount of the property condemned, with condition to prosecute such appeal with effect, and to pay the value of the property condemned, and fine imposed, and all costs attending such proceedings in case such judgment shall be confirmed, and in all cases of appeal either party shall be entitled to trial by jury.

To give security.

Laws 1872, *Chap.* 267, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall be unlawful for non-residents of *Dorchester* county, to take, catch, destroy, or dredge for terrapins in the waters of said county; any person or persons violating the provisions of this Act, upon conviction before any Justice of the Peace of said county, shall forfeit and pay the sum of not less than fifty dollars, nor more than one hundred dollars, and stand committed to the jail of said county, until the same shall have been paid; one-half of said fine to go to the informer, the other half to be paid into the treasury of the school fund of said county by the Justice of the Peace before whom the case may have been tried.

None save residents to fish.

FREDERICK COUNTY.

Laws 1862, *Chapter* 241, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That any person or persons, throwing, putting or placing lime, or any other poisonous substances, into any of the creeks, streams of water, or any of their tributaries, in Frederick county, for the purpose of catching, taking, or destroying fish in any of the said creeks, streams of water, and their tributaries in said county, shall for every such offence, upon conviction thereof before a Justice of the Peace of said county, be fined in a sum of not less than twenty nor more than fifty dollars; said fines to be applied to the primary school fund of Frederick county.

Throwing lime or poisonous substance in creeks, &c., forbidden.

Sec. 2. *And be it enacted*, That in the event of the failure or refusal of any person so convicted, to pay such fine, the Justice of the Peace imposing said fine shall commit him to the jail of Frederick county, for not less than three nor more than six months.

Upon failure to pay fine the offender shall be committed to jail.

Laws 1872, *Chapter* 238, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That the County Commissioners of Frederick county be, and they are hereby authorized in their discretion, to levy upon the assessable property of said county, a sum of money sufficient to defray the expense of the construction of "Fish Ways," or ladders, to facilitate the passage of fish over the mill dams at *Greenfield* Mills and Buckeystown on the Monocacy River in said county, said ways to be constructed under the discretion of such person or persons as may be designated by said County Commissioners.

Authorized to construct "Fish Ways."

Laws 1874, *Chapter* 173.

This Act repeals Section 1 *of Chapter* 320, *Laws* 1872, *and re-enacts the same with amendment.*

Sec. 1. From and after the passage of this Act, it shall not be lawful for any person or persons to take, capture or destroy fish by seine or seines, drag-net or drag-nets, fish-baskets or fish-pots, eel weirs, brush or fascine nets, or any means or contrivance whatever, of the nature of a seine, which are known to destroy or capture fish, in the Monocacy River, or any of its tributaries within the limits of Frederick county in the State; *provided*, that it may be lawful to (lawful to) take fish in any way in any of the said tributaries, one mile above the mouth of such tributaries.

Not lawful.

Laws 1872, *Chapter* 320, *enact*—

Sec. 2. *And be it enacted*, That any person or persons offending against the provisions of the preceding section, shall be liable, upon conviction thereof, by summary process, before any Justice of the Peace of this State, in and for Frederick county aforesaid, to a penalty of not less than ten nor more than thirty dollars, one-third to the informer, one-third to the Constable who may make the arrest, and the balance to be paid to the

Persons violating liable to fine.

Proviso.

Treasurer of the Board of County School Commissioners for school purposes; *provided*, that any person or persons so offending, on conviction thereof as aforesaid, who shall refuse, or fail to pay said fine imposed, and the costs thereon, such person or persons shall be imprisoned in the County Jail of the county aforesaid for not less than ten, nor more than twenty days.

Duty of Constable.

Sec. 3. *And be it enacted*, That it shall be the duty of any Constable to whose attention a violation of the provisions of this Act is called, at once to report the same to the Justice of the Peace, and upon warrant issued to arrest the offender or offenders and bring him or them before said Justice for trial; and any Constable who fails so to report a case of offence with the name of the offender, under this Act, when notified as aforesaid, shall himself be liable to a penalty of ten dollars, to be *recoverable* as like penalties are now by law recoverable.

Cost by whom paid.

Sec. 4. *And be it enacted*, That upon the failure to establish the guilt of any person or persons charged with violating the provisions of this Act, all costs shall be paid by the original informer, or the accused, or both of them at the discretion of the Justice.

Party aggrieved may appeal.

Sec. 5. *And be it enacted*, That any person or persons who may feel himself or themselves aggrieved by any judgment rendered by a Justice of the Peace, under the provisions of this Act, shall have the right to appeal to the Circuit Court for Frederick county, upon the conditions and subject to the regulations now provided by the general law regulating appeals from Justices of the Peace; but execution of the judgment of the Justice of the Peace shall not be stayed, unless the party appealing shall give bonds to the State for double the amount of the find imposed, with security, approved by the Justice rendering the judgment, with condition to prosecute his appeal with effect, or to pay the fine imposed, with all costs.

Execution not to be stayed.

In force.

Sec. 6. *And be it enacted*, That this Act shall take place from and after the date of its passage, and continue in force until the first day of October, in the year eighteen hundred and seventy-five.

HARFORD COUNTY.

Code Public Local Laws, Art. 12.

Duty of Constable.

Sec. 38. The County Commissioners of Harford county, shall appoint annually a Constable in the district adjoining the Bald Friar Ferry, on the Susquehanna River, whose duty it shall be to examine every fish pot erected in the river, at least once a week in the season the young Shad usually descend the river, and if they find any fish nets erected in the river within the limits of Harford county, not constructed so as to admit the free passage of young Shad, or with the bottom thereof covered with a basket or any other device, so as to close the opening therein whereby the young shad may be destroyed, they will give notice thereof to any Justice of the Peace of the county, who shall upon such information of said Constable, or of any other person on oath, issue his warrant to apprehend such owner and take him before some Justice of the Peace of the county, and he shall, by the Justice before whom he may be taken, be compelled to enter into recognizance for his appearance at the next term of the Circuit Court for Harford county.

Indictment.

Fine.

Sec. 39. The person so arrested shall be proceeded against by indictment in the Circuit Court aforesaid, and upon conviction or confession of the offence charged, shall be fined by the Court not exceeding sixty dollars for any such offence, one-half to the Constable aforesaid, or such other peras shall prosecute the same, the other half to the use of the county.

Pay of Constable.

Sec. 40. The said Constable, for the discharge of the duties aforesaid, and upon his making the oath thereto, shall be allowed by the County Commissioners, the sum of sixteen dollars per annum.

Penalty.

Sec. 41. If any person using a fishery on the west side of the Susquehanna River, shall, for the space of ten days after the expiration of the fishing season, neglect to remove any putrifying pickle from the fishing shore, and cleanse the vessels used in curing fish, or suffer quantities of fish to remain and putrefy on the fishing shore he shall forfeit the sum of five dollars and immediately remove such putrid fish and pickle, and cleanse the vessel used in curing fish, and on refusal, or neglect so to do, for the space of five days thereafter, shall forfeit the sum of twenty dollars; the said penalties to be recovered before a Justice of the Peace for Harford county as small debts, the one-half to the informer and the other half to the county.

Laws 1867, *Chapter* 47, *enact.*

Fishing limited.

Sect. 1. *Be it enacted by the General Assembly of Maryland*, That the fishing season in the waters of Romney Creek, in Harford county, shall begin on the fifteenth day of March, and end on the first day of October succeeding in each and every year, and fishing in every mode and manner is hereby prohibited in said creek, for the time intervening between the first day of October and the fifteenth day of March succeeding in each and and every year.

Certain practices declared unlawful.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons to whip or beat the waters of Romney Creek, in Harford county, with poles, sticks or any other thing for the purpose of driving fish into seines, fish-baskets or any other contrivances for catching fish, nor for the purpose, or which will have the effect of driving or frightening wild ducks or water fowl of any description from their breeding or roosting grounds in said creek, or to erect any fish-pot, or to fish with any drag-net, fish-basket, or any other snare during the time intervening between the first day of October and the fifteenth day of March succeeding, in each and every year.

Penalty for non compliance.

Sec. 3. *And be it enacted*, That if any person shall violate any of the provisions of this Act, he shall, for every such offence, upon conviction before any Justice of the Peace of Harford county, be fined a sum not less than ten dollars nor more than thirty dollars, one-half of said amount to be given to the informer, and the other half to be paid over to the School Commissioners of said county for school purposes.

To be imprisoned.

Sec. 4. *And be it enacted*, That in the event of the failure or refusal of any person so convicted to pay such fine, the Justice of the Peace imposing the fine, shall commit him to the Jail of Harford county, for not less than thirty, nor more than sixty days.

Laws 1870, *Chapter* 231.

This Act originally embraced Caroline and Kent counties, but by Chapter 31, *Laws* 1872, *they were exempted from its provisions.*

Not to beat or lash the water.

Sec. 1. *Be it enacted by the the General Assembly of Maryland,* That it shall not be lawful for any person or persons, to lash or beat the waters within the limits of Queen Anne and Harford counties, or which wash the shores of all or any two, or either of these counties, with rods, poles, sticks or anything else, or make noises on the deck of any boat or on part of any boat by the use of clogs or wooden shoes, or by any other instrument or means or in any other manner for the purpose of driving fish into any seine, fish basket, or any other contrivance for catching fish, nor for the purpose or which will have the effect of driving or frightening wild ducks or water fowls of any description from their feeding or roosting grounds in the water of said counties.

Fine for violating.

Sec. 2, *And be it enacted,* That any person violating any of the provisions of the preceding section shall pay a fine of not less than ten nor more than one hundred dollars, and forfeit the boat together with her tackle and apparel, and her seine and all other property on board of her at the time of her seizure.

Warrant and seizure.

Sec. 3. *And be it enacted,* That on information given on oath to a Justice of the Peace of that county most adjacent to the waters in which it is claimed a violation of the first section of this Law is being or has been committed, he shall issue his warrant for the arrest of the offender or offenders, and the seizure of the boat together with all her tackle and apparel, and all other property on board, and in their possession, which warrant shall be directed to the Sheriff or some Constable of said county, and the Sheriff or such Constable may summon the *posse comitatus* to aid him in making any arrest and seizure authorized by this Act.

Penalty.

Sec. 4. *And be it enacted,* That upon the arrest of the offenders they shall be taken before a Justice of the Peace, of that one of the aforesaid counties most adjacent to the waters in which the offence has been committed, and tried, and if found guilty, shall pay a fine of not less than ten, nor more than one hundred dollars, to be recovered as other small debts are now recovered, and the said Justice shall condemn all property seized by the officers making the arrest, which shall appear in proof to have been in possession of the parties found guilty, or used by them in violation of the first section of this Act, and adjudge and decree the same to be sold.

Sale of property.

Sec. 5. *And be it enacted*, That the property so as aforesaid condemned shall be sold by the officer making the seizure on ten days notice by either written or printed advertisement placed in four public places, and the proceeds of sale after deducting the costs of proceedings, and the expenses of sale shall be divided as follows: one-fourth to the officer making the seizure, and the residue to be divided equally among the persons who aided him in making such seizure.

Appeal.

Sec. 6. *And be it enacted*, That any party who had been adjudged guilty of a violation of the provisions of this Act, and feels himself thereof aggrieved, shall have the right of appeal to the County Circuit Court of the county in which he has had a trial.

MONTGOMERY COUNTY.

Laws 1874, *Chapter* 129, *enact*—

Not lawful.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons, to take, catch or kill any fish in or from the waters of any of the creeks or streams of water in Montgomery county, by any set nets, dip nets, or any other device except by hook and line.

Penalty.

Sec. 2. *And be it further enacted*, That any person or persons violating any of the provisions of this Act, shall forfeit and pay the sum of five dollars for each and every offence; said sum to be recovered before a Justice of the Peace as debts of like amount are now recoverable in the name of the State, with costs of suit, and to be appropriated to the school fund of said Montgomery county.

Sec. 3. *And be it further enacted*, That the County Commissioners of Montgomery county be, and they are hereby authorized, in their discretion, to levy upon the assessable property of said county, a sum of money sufficient to defray the expense of the construction of fish warps or ladders, to facilitate the passage of fish over any mill dams, upon any of said creeks or streams of water in said county, said fish warps or ladders to be constructed under the direction of such person or persons as may be designated by said County Commissioners.

Levy to pay for the construction of fish ladders.

QUEEN ANNE'S COUNTY.

Laws 1870, *Chapter* 231.

Provisions same as are given above under the head of Harford county.

ST. MARY'S COUNTY.

Laws 1872, *Chapter* 404.

This Act repeals Chapter 61, *Laws* 1870.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons except *bona fide* citizens of St. Mary's county, to haul a seine in any of the tributaries or waters of the Potomac River, lying and being in St, Mary's county, or to take or catch terrapins in any of the aforementioned tributaries or waters: nor shall it be lawful for any person or persons, except *bona fide* citizens of Charles and St. Mary's counties, to haul a seine or catch or take terrapins in the Wicomico River or its tributaries.

Not lawful for any save residents.

Sec. 3. *And be it enacted*. That it shall not be lawful for any person or persons to haul a seine of more than eighty fathoms in length, within a mile of the Maryland shore, in that portion of the Potomac River between Cobb's Point, in Charles county, and Point Lookout, in St. Mary's county except from the fifteenth day of March to the fifteenth day of May, inclusive.

Not lawful to haul seine.

Sec. 4. *And be it enacted*, That any person or persons violating the provisions of either of the preceding sections of this Act, shall pay a fine of not less than five nor more than fifty dollars, in the discretion of the Justice of the Peace before whom

Persons violating.

Forfeit.

the party or parties may be taken, and forfeit absolutely the boat or boats and vessel in his or their possession, together with the seine or seines, tackle and all things on board the said vessel, boat or boats at the time the offence may have been committed.

To issue warrant for arrest of.

Sec. 5. *And be it enacted*, That upon information given upon oath to any Justice of the Peace, of violation of the provisions of this Act, he shall issue his warrant for the arrest of the offender or offenders, and for the seizure of the vessel, boat or boats, seine and tackle, and all things on board subject to forfeiture, which shall be directed to the Sheriff or any Constable, with or without warrant, to arrest any person or persons violating the provisions of this Act, and to seize any such vessel, boat or boats, or other fishing outfit so found, having been or being used in violating any of the provisions of this Act, and to bring such offender or offenders before a Justice of the Peace most accessible or convenient, to be dealt with as herein provided.

Duty of officers.

Citizens may arrest.

Sec. 6. *And be it enacted*, That it shall and may be lawful for any citizen or citizens having knowledge of the violation of the provisions of this Act, to arrest any person or persons, so as aforesaid violating the provisions of this Act, and to bring such offender or offenders before any Justice of the Peace, to be dealt with according to the provisions of this Act.

To be condemned and sold.

Sec. 7. *And be it enacted*, That if upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner, or person or persons having charge of the property so seized, is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or any Constable, after ten days public notice, and the Justice may proceed *ex parte* to hear and determine any question of forfeiture, if the owner or owners fail to appear after the notice herein required to be given: and in all cases, arising under this Act, an appeal may be taken to the Circuit Court for St. Mary's county, subject to the same laws and rules that govern in other cases of appeal from the decisions of Justice of the Peace.

May appeal.

Unknown person offending.

Sec. 8. *And be it enacted*, That the Sheriff or Constable, or other party or parties making the seizure of property under this Act, if they do not know the name of the owner, or person having charge thereof, he may describe him in the notice he is required to give as the owner of the property, without naming him: and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law, without naming such person.

Apportionment of fines and forfeitures

Sec. 9. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid, with all fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided, one-fourth to the Sheriff or any Constable making the seizure, one-fourth to those aiding in making the arrest and seizure, and the remaining one-half to the Board of School Commissioners for St. Mary's county, for the use of the primary schools for said county; and when made by any citizen or citizens, one-half of the net proceeds of sale, after paying the charges as aforesaid, shall be paid over to the captors, to be equally divided between them, and the remaining one-half thereof to be paid to the School Commissioners of said county, for the purposes above-named.

SOMERSET COUNTY.

Code Public Local Laws, Art. 19.

Unlawful to place seine.

Sec. 58. No person shall stake out or fix any seine across the River Wicomico, in Somerset county, or aid or assist therein, by which fish may be obstructed in going up or coming down said river.

Penalty.

Sec. 59. Any person offending against the provisions of the preceding section shall, for every offence, forfeit the sum of twenty dollars, to be recovered by action or indictment in the Circuit Court of the county, where the offender shall be apprehended or resides, one-half to the informer, and the other half to the county.

Sections 60 *and* 61 *are repealed by Art.* 24, *Declaration of Rights, Const. Md., p.* 18.

May lawfully remove seine.

Sec. 62. Any person may destroy or remove any seine staked or fixed across said river to obstruct the passage of fish, and if he be sued therefor, he may plead the general issue, and give the special matter in evidence.

Justice shall account.

Sec. 63. Every Justice of the Peace who shall receive any money under the provisions of section 61 of this Article, shall, under the penalty of one hundred dollars, account for the same to the County Commissioners of said county.

Laws 1874, *Chapter* 383, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons, except resident citizens of Somerset county to fix, set or stake out any sort of gill-net, either stationary or floating, any device whatsoever, for the catching or taking of herring, shad or other kind of fish in the waters of Monie Bay, Monie Creek, or its tributaries in Somerset county.

None save residents to fish.

Sec. 2. *And be it enacted*, That any person or persons violating the provisions of the preceding section shall be arrested, and the boats, seines and materials using in fishing shall be seized; and upon conviction thereof before any Justice of the Peace for Somerset county, shall be fined not less than fifty, nor more than two hundred dollars; one half of said fine to go to the officer making the arrest, and the other half to the school fund of said county.

Penalty.

Forfeiture.

Sec. 3. *And be it enacted*, That in default of the payment of the fine provided in the second section of this Act, the said boat or boats, seines and materials used in fishing, the same so seized shall be condemned, and sold to pay said fine and costs, after giving ten days' notice thereof by handbills posted near the place of seizure, and if the owner or owners of any property so seized shall be unknown, or shall make his escape, or shall fail to appear within five days after such seizure, the said property shall be condemned and sold as is hereinbefore provided.

Laws 1874, *Chapter* 492, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That no person or persons shall take or catch fish with or use or employ in the taking and catching of fish in the waters of the Pocomoke River and Sound, below the village of Shelltown, with any net, seine, pike, fish-trap or any other instrument consisting of meshes smaller than three inches in size. Size of seine.

Sec. 2. *And be it enacted*, That any person catching or taking fish contrary to the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace of this State, shall be punished by a fine of not less than fifty, nor more than one hundred dollars, one-half thereof shall be paid to the informer, and the other half to the County Commissioners of the county or ccunties where the offence was committed, for the use of the said county or counties. Penalty.

TALBOT COUNTY.

Sections 2 *and* 3, *Chapter* 466, *Laws* 1874, *the provisions of which have been given above, under the head of Caroline county, now constitute sections* 86 *and* 87 *of this Art.*

Code Public Local Laws, Art. 20.

Sec. 88. Any Justice of the Peace of said county may issue a warrant, directed to the Sheriff or any Constable, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt, shall fine him not less than five, nor more than fifty dollars, and shall also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used in violation of this law, and all the furniture, tackle and apparel, and all things on board at the time of her seizure; and shall direct the Sheriff or Constable to sell the same to the highest bidder for cash, after ten days' notice, at two of the most public places in the neighborhood. Fine.

Sec. 89. After the payment of the costs of prosecuting the offending party, the proceeds of the fine and sale of the boat, and other articles condemned, Appropriation of fines.

shall be appropriated in the following manner: one-fourth to the Sheriff or Constable making the arrest and seizure, and the residue amongst those whom he may have summoned, and who may have aided in the same, to be determined and awarded by the Justice of the Peace.

Appeal.

Sec. 90. Any person aggrieved by any judgment rendered against him by a Justice, under the 88th section of this Article, may appeal therefrom to the Circuit Court for Talbot county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases.

WASHINGTON COUNTY.

Laws 1874, *Chapter* 334. *This Act repeals the corresponding sections of Art.* 21, *Code of Public Local Laws.*

Not lawful.

Sec. 102. It shall not be lawful for any person to whip or beat the water in the Antietam Creek, or its tributary streams, Bear Creek, Long Meadow Branch and Little Antietam, with poles, sticks or other things for the purpose of driving the fish into nets, seines, fish-baskets or other snares, or to erect any fish-pot or to fish with any net, basket, gig, trot-lines, or in any other manner except with the angling-rod and dip-nets.

Forfeiture.

Sec. 103. Any person offending against the provisions of the last preceding section, shall forfeit and pay for each offence, and for every month a fish-pot is suffered to remain, the sum of twenty dollars, to be recovered in the name of the County Commissioners of said county, before a Justice of the Peace, one-half to the informer and the other half to the School Fund of said county.

Section 104, *is repealed by Art.* 26, *Declaration of Rights, Con. Md., p.* 18.

Justice shall account.

Sec. 105. Every Justice of the Peace shall annually account with the County Commissioners of the county, at their meeting to make the county levy, for all fines received under this law, under the penalty of twenty dollars for each fine by him imposed or received.

Laws 1870, *Chapter* 75, *expired by its own limitation on the* 1*st April*, 1872.

WORCESTER COUNTY.

Laws of 1870, *Chapter* 190. *Section* 2 *of this Act repeals Sec.* 1 *of Chapter* 442, *Laws* 1868, *and re-enacts the same with amendments.*

Length of seine.

Sec. 2. *Be it enacted*, That if any person or persons, shall haul or fish with any seine or seines over one hundred fathoms in length, in Synapuxent Bay or its tributaries, or in any of the bays or their tributaries, on the eastern side of Worcester county, above the line of Virginia, he or they shall be fined in a sum not exceeding one hundred dollars for the first offence and two hundred dollars for every subsequent offence, with all costs accruing in the prosecution of such offender or offenders.

Laws 1868, *Chapter* 442, *enact*—

Penalty for fishing.

Sec. 2. *And be it enacted*, That no gill-net, set-seine or other contrivance for catching fish, (otherwise than a hauling seine) in any of the waters aforesaid, shall exceed in length or extent seventy-five fathoms, and any person or persons so offending, shall forfeit and pay one hundred dollars, together with all costs and charges in the prosecution of such offender or offenders.

Heard before Justice of the Peace.

Sec. 3. *And be it enacted*, That the offences named or contemplated by this Act may be heard by any Justice of the Peace of this State, before whom the offending party or parties may be brought, or any Justice of the Peace of this State, who, upon information shall issue a warrant for the apprehension of any such offender or offenders: the said Justice upon hearing proof may either discharge the accused, or cause him or them to enter into recognizance, with sureties, in double the amount of the penalty, for any violation of the provisions of this Act, to appear at the then session of the next term of the Circuit Court for Worcester county, to answer for the offence and to satisfy the judgment which may be rendered against him or them therefor, or in default thereof, the said party or parties to be committed to the County Jail until such recognizance be given.

Fines to be divided.

Sec. 4. *And be it enacted*, That all fines or penalties imposed by this Act, shall be divided, one-half to the informer, and the other half to be applied to the improvement of the public roads in said county.

CASES RELATING TO ABOVE SUBJECT MATTER.

As to acquisition of a several right of fishery by prescription.

See Day & Gorsuch *vs.* Day, 4 Md. Rep., 262.
Del. & Md. R. R. Co. *vs.* Stump, 8 G. & J., 479.

The patentee of land covered by navigable water can only claim in subordination to the rights of the public of fishery and navigation.

Hammond's Lessee *vs.* Inloes, 4 Md. Rep., 138.
See, also, Chapman *vs.* Hoskins, 2 Md. Ch. Dec., 485;
And, Patterson, et al., *vs.* Gelston, 23 Md. Rep., 445.

As to fishing on the Potomac with Gill Nets:

The State *vs.* Hoofman, 9 Md. Rep., 28.
Georgetown *vs.* Alex. Car. Co., 12 Pet., 95.
Binney's Case, 2 Bl., 125.

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REPORT

OF THE

COMMISSIONERS OF FISHERIES

OF

MARYLAND.

TO THE

GENERAL ASSEMBLY,

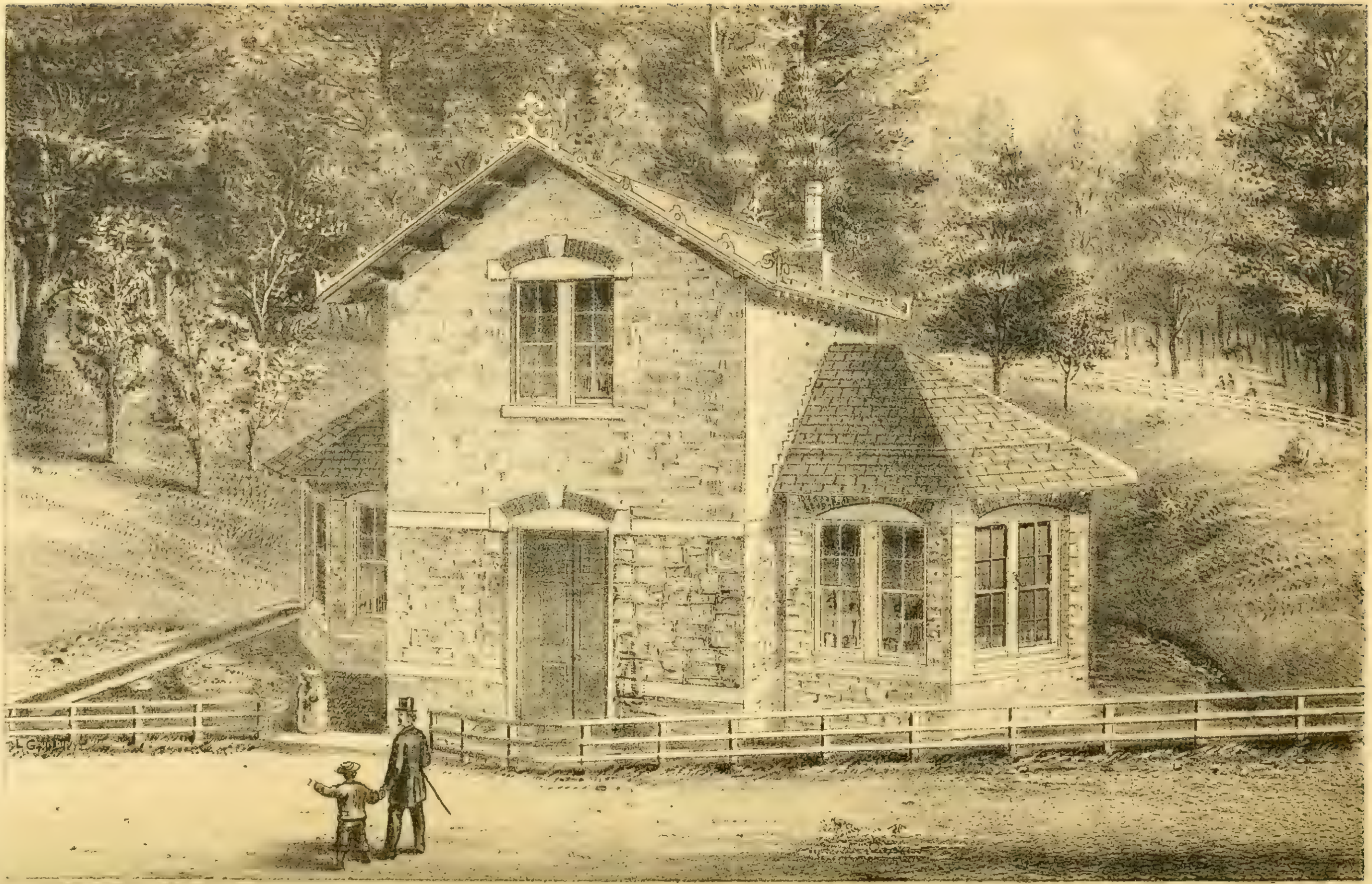
JANUARY 1st, 1876.

ANNAPOLIS:
JOHN F. WILEY, State Printer.
1876.

Compliments of

T. B. Ferguson,

COMMISSIONER.



A HOEN & C^o BALTIMORE

DRUID HILL HATCHING HOUSE.

REPORT

OF THE

COMMISSIONERS OF FISHERIES

OF

MARYLAND,

January 1876.

ANNAPOLIS,
JOHN F. WILEY, Printer.
1876.

REPORT

OF THE

Commissioners of Fisheries

OF

MARYLAND.

To His Excellency, JAMES BLACK GROOME,
Governor of State of Maryland:

The Commissioners appointed by your Excellency in pursuance of Chapter 150, of the laws of Maryland, enacted at the session of the General Assembly of 1874, beg leave to submit the following:

We have combined the report of 1874, (not printed,) with that of 1875, that the work of the Commission, from the adjournment of the Legislature of 1874, to the assembling of that of 1876, might be transmitted to that honorable body by your Excellency in its entirety. It is much to be regretted that we are without reliable statistics of the annual yield of our waters, and have only to rely on information furnished from the memory of fishermen and fishdealers, but enough has been obtained to satisfy us, that the most valuable fisheries are becoming less and less productive, and our waters are being depleted of their yield of fishfood, to an alarming extent, and we now feel that necessity for the protection of our fishes, and the resort to artificial means of fish culture to restore our waters, which has stimulated in turn, other more densely peopled countries. Most of the States have been impelled to protect and propagate food fishes in consequence of the fearful decrease in the yield of their fisheries, save the State of California, which is with great foresight, prosecuting this branch of State industry with vigor, while her waters are yet comparatively bountifully supplied.

The record, of the results obtained in other countries, and in those States which have bestowed a fostering care on their fisheries, enables us to report that we can, at no great expense, make our rivers and bays, even more productive than they ever have been, and the best food fishes more abundant than when the earliest settlers of this country commenced their destruction.

The natural geographical advantages of the State of Maryland, are so great that no effort should be wanting to make our waters, one-fifth the whole area, yield their utmost abundance. The rivers of the more Southern States are year by year becoming more and more depleted, and their unhappy condition both pecuniarily and politically renders it improbable that they will be able for many years to do anything towards the restoration of their fisheries. The spring fishes of the Chesapeake Bay, being the earliest in market, will command the most remunerative prices, and the great railroad facilities, and the improved means of transporting fresh fish to the interior, by the use of ice, and refrigerating cars, renders it impossible to so overstock the market, that the capture of our best food fishes would be unremunerative.

Co-operation of Va., on the Potomac.

Your Excellency appreciating the necessity for the co-operation of the State of Virginia, in any efforts to be made for the restoration of the fisheries of this most important and productive river, instructed one of your Commissioners to visit Richmond, the General Assembly of Virginia, being then in session, making him the bearer of a letter to His Excellency Governor Kemper, in which his attention was called to the action taken by the State of Maryland, for the increase of fishes, and urging concurrent action by the State of Virginia, so far as the Potomac was concerned. Your Commissioner was cordially received by His Excellency, who expressed his hearty desire for co-operation in the work, and placed him in communication with the Committee "on the Chesapeake Bay and its Tributaries" to whom the subject was referred. Your Commissioner was invited by the Chairman (General Taliaferro) to appear before the committee, and explain to them the ends which it was hoped could be accomplished. After their deliberations, the committee reported unanimously, a bill similar to that enacted by the Maryland Assembly, creating a commission, and making an appropriation for fish culture, but unfortunately for the inhabitants of the Potomac as producers, and the people of the States as consumers, owing to the adjournment of the Virginia legislature, the bill was not passed until the following session. We are happy to report that the bill became a law on the twenty-fifth day of March, 1875, and Messrs. A. Moseley, W. B. Robertson and M. G. Ellzey, were appointed Commissioners. Your Commissioners have been in constant communication with them, and have found them on all occasions ready to co-operate, to the extent of their means, in any work on the Potomac, tending to the benefit of that river.

SHAD, (*Aloso sapidissima.*)

This being the most important of the food fishes of our waters, your Commissioners immediately on their appointment, sought for means for their increase by artificial propagation; and the following letter was addresed to the United States Commissioner of Fish and Fisheries, Professor Spencer F. Baird, who had kindly promised his aid in this most important work.

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St.*, *Baltimore*, 9th April, 1875.

Prof. SPENCER F. BAIRD, Commissioner General,
Fish and Fisheries, U. S., Washington, D. C.

Dear Sir:—Knowing that you are in communication with many efficient persons, expert in manipulating ripe fish and hatching the spawn, I write to beg you to secure for our commission the services of a competent person, and make the necessary arrangements for hatching station to be established to take advantage of the spawning season of our Shad and Rock. I will select the locality at which our operations will be conducted, as soon as I return from my mission to Richmond. My absence at this time renders it necessary for me to ask your valuable assistance in this matter. As you are aware that our appropriation is very limited it is not necessary for me to ask you to make these arrangments on as economical a scale as consistent with efficiency. I have the honor to be very respectfully, your obedient servant,

T. B. FERGUSON, Commissioner of Fisheries.

As it was thought that Seth Green's hatching box was covered by letters patent, and was the only one adapted to Shad hatching in our waters, your Commissioners deemed it advisable to have a conference with the inventor in hopes that he would modify the terms on which he had offered the use of his boxes to the States, two thousand dollars in cash, royalty for their use for three years. We were unable to obtain more favorable terms than the following propositions:

"*Proposed memorandum of agreement between the Maryland Commissioners of Fisheries, and Seth Green of Rochester, New York, for hatching Shad in Maryland during the spawning season of* 1874.

Seth Green agrees to furnish the necessary labor for manipulating the fish and the necessary implements and equipments, and perform all the work connected therewith during the spawning season for Shad, furnish the necessary transportation for, and board the men employed by him for two camps, one on the Patuxent river, and one on one of the rivers of the Eastern Shore of Maryland. The Commissioners of Fisheries for Maryland, agree to furnish the fish as taken at the several camps to Seth Green to be manipulated for spawn, and agree to pay to Seth Green eleven hundred dollars, one-half of the amount, being five hundred and fifty dollars, to be paid when the camps are established, and the other one-half, being five hundred and fifty dollars, to be paid at the close of the season."

The second proposition submitted by Seth Green, was that the Commissioners of Fisheries should pay to him, six hundred and sixty-six dollars and sixty-six cents for the right to use his boxes, for one year, and two dollars per diem for men to operate them, the Maryland Commissioners to pay all expenses of transportation and board. After consultation with the U. S. Commissioner, it was deemed advisable to decline these modified terms, as the season was then so far advanced, that the probable results would not authorize the expenditure of so large a portion of the appropriation. This letter was therefore addressed, declining to perfect either agreement proposed, viz:

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St.*, *Baltimore*, *Md.*,
May 21*st*, 1875.

MR. SETH GREEN, Rochester, N. Y.

Dear Sir:—I found on my return, after a careful examination of the subject, that it would not be advisable for us to expend so much of our appropriation for shad hatching, as the agreement proposed by us would necessitate, as the shad have not yet become so scarce as to make their diminution felt by our people. I hope that we will be able to arrange our expenditures this year, so that we will have a sufficient amount next year to enter into an arrangement with you, and early enough in the Spring to take advantage of the whole spawning season, which commences and ends much earlier with us than in your State, As I think the Senate will pass the deficiency appropriation bill, which has passed the House, in time for Professor Baird to commence operations next week, you will have your hands full * * * *

Very truly, yours, T. B. Ferguson,
Commissioner of Fisheries, Md.

It was impossible to devise other apparatus suitable for hatching shad, before the close of the fishing season of 1874. Your Commissioners, however, conducted a series of experiments, and obtained information necessary to insure a success in shad hatching the following season, the results of which will be seen by a reference to the subsequent table, showing the operations during the season of 1875. Professor Baird, U. S. Commissioner of Fisheries, however, assured your Commissioners, that should the bill then pending pass Congress, making the necessary appropriation for fish culture, in time to find any ripe fish in the Potomac, he would push operations vigorously on that river. The season was so far advanced before the appropriation was made, that he was unable to operate south of the Delaware. In reply to an application for young shad from his camps on the more Northern Rivers, letters dated June 26th and 27th, were received from Professor Baird, authorizing the Commissioners to call on Dr. J. H. Slack, who would have charge of a hatching camp on the Delaware, and stating that he had been instructed to transfer as many young fish as he could to the waters of Maryland. We therefore addressed this letter, viz:

Maryland Commission, Fish and Fisheries,
192 *N. Charles St., Baltimore,*
June 28th, 1874.

Dr. J. H. Slack,
Dept. U. S. Commission Fisheries,
Bloomsburg, N. J.

Dear Sir:—I have received a letter from Prof. Baird, asking me to communicate with you on the subject of a supply of young shad, in case you succeed in finding any ripe live eggs. Please let me know if you have established your hatching camp yet, at what point, and with what success? I would like to run on and make you a visit, and arrange for the distribution of some young shad in our Eastern Rivers, easily reached from your camp.

I am very respectfully, &c., T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

To which the following reply was received:

POINT PLEASANT, PA.,
June 29th, 1874.

My Dear Sir:—Your's received. We are doing well here, though the weather is very hot, 97½° at 2 o'clock P. M., to-day. Can give you, I think, a fine lot of shad next week. Have taken in three days two hundred thousand spawn. I shall be absent on evening of July 2nd, and until July 6th, probably. Can you come up on Monday (July 6th)? as the sooner the better. I will try to have cans for you, and can send a man, if necesary, with you on your return * *

* * * * * * * * * * *

Your's, J. H. SLACK, M. D.,
Dept. U. S. Commission Fisheries.

T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

We therefore proceeded to Point Pleasant, but on reaching the hatching camp on the night of 6th of July, were disappointed at finding that Dr. Slack had not returned, having been detained at his home by severe illness, which prove fatal. His untimely death is thus announced in the report of the New Jersey Commissioners: "By this event the State has lost a valuable officer, and his colleagues, an able and ardent coadjutor. In the prime of manhood, possessing a highly cultivated intellect, the bent of his intellect led him in the pursuit of Natural Sciences, especially that branch relating to pisciculture. In this he became distinguished and pre-eminently fitted for the position he held; when by exposure while in charge of a shad hatching camp on the River Delaware, under the auspices of the United States Commissioner of Fisheries, he contracted a pleurisy, which terminated fatally on the twenty-seventh day of August last."

In the absence of Dr. Slack, the young fish, which were intended for the Maryland Waters, were turned into the

Delaware River by the fishermen. After waiting for a few days in the neighborhood, we found it impossible to overcome the indisposition on the part of the fishermen to the young fish being removed to other waters, and were compelled to return without the hoped-for shad. Thus ended the efforts of the Commission to increase this most valuable fish in the year 1874. All efforts tending to stocking and re-stocking our rivers with this and other migratory fishes, is hypothecated on the theory of their return as adults, for the purposes of reproduction, to those rivers in which their minority had been passed. The heretofore accepted theory, that shad formed in an immense school, on the Southern Atlantic Coast, which sending off divisions as it moved northward up the several rivers successively, from Florida to Nova Scotia as the season advanced, is no doubt incorrect, for the more Southern Rivers do not continue their abundance, but those rivers formerly abundant which have been exhausted by over fishing, or by obstructions preventing the fish from reaching their spawning grounds, continue unproductive, irrespective of their geographical positions, and those rivers in which artificial propagation has been resorted to, continue year by year to be more and more productiue. The immense numbers and the extreme delicacy of the shad, which prevents their being handled, and the probable length of time which they remain in the sea, has rendered it impossible to ascertain with that accuracy, with which the motions of the salmon have been determined by marking them, but, it is reasonable to take it for granted, that the same natural laws govern the shad in their migrations. It has been ascertained by marking the salmon in various ways, such as cutting off the adapose dorsal fin, when they are preparing for their first visit to the sea, and by attaching tags, etc., that the salmon invariably return to the rivers in which they were bred. We, therefore report, that the best means to re-stock our rivers, would be to establish hatching stations on as many of them as spawners can be obtained, and the fish should be turned into the streams as high up as practicable, and that the maximum amount of ova be collected each year.

To accustom the young fish to the upper waters, and to create in them a desire to ascend to the sources of our rivers.

in case fishways are erected to provide their passage over the Great Falls of the Potomac, and other obstructions on the Potomac and Gunpowder, we transported and turned into the Potomac, at Piedmont, some sixty thousand young shad, and into the Gunpowder, near Cockeysville, some thirty thousand. Should efficient fishways be erected, the survivors will return to the upper waters of these streams when adults for the purpose of spawning, and they will become plentifully stocked with this and other anadromous fishes.

As the appropriation did not admit of our establishing more than two hatching camps for shad, we sought the aid of the U. S. Commissioner on the Potomac River, that we might devote the means at our disposal to those rivers, entirely within the limits of the State. Prof. Baird generously agreed to furnish the men and means to operate two hatching stations on the Potomac. To enable us to select proper localities, and make the necessary preliminary examinations, he secured from the Secretary of the Navy, the detail of the U. S. Steamtug Triana, L. S. Cook, commanding, and invited the Commissioners for Virginia, just appointed, to accompany us. On the 29th of April we sailed from the Washington Navy Yard, Prof. J. W. Milner, Dep. U. S. Commissioner, representing Prof. Baird; Mr. T. B. Ferguson, the Maryland Commission: and Messrs. Robertson and Moseley, that of Virginia. We examined the fisheries on the Potomac, and then ascended the Patuxent, as far as Bristol, examining the fisheries on that river. We found Freestone Point, lying between Powell's and Neabsco Creeks, admirably adapted for shad hatching; being an excellent shad fishery, the ripe fish apparently selecting the extensive flats at this point for spawning, and Powell's Creek furnishing a safe harbor for the hatching boxes, protected as they would be from the north and north-west winds. The railroad, with a regular station at the creek, furnishing easy communication with Washington. It was therefore decided to commence operations at that point, having obtained permission from Mr. Jacob Faunce, to procure the spawn from the ripe fish taken in his seine. Moxley's Point was also selected as a suitable location for a second camp. This fishery is located at the mouth of the Piscataway Creek, and operated by J. Skidmore. The success of the U. S. Commission at Jackson's City two years previous, indicated that as a proper point later in the season. We are indebted to the U. S. Commissioner for the details on the success of his operations, Table "A."

In visiting the several fishing shores during the fishing season, we explained the object of the commission, and when ripe fish could be obtained, illustrated the manipulation of the spawn; we found the fishermen hopeful of the results. As it may be a matter of much interest to those who have not had an opportunity of seeing our operations, we give a detail description of the process, and the kind of apparatus used. We are indebted to the Report of the United States Commissioner for this description of the "Seth Green shad hatching box," which was used by us during the season of 1875, and as the methods employed were substantially the same, as those described by Professor Milner in the Report of the United States Commission, we reproduce his concise description, viz:

"The apparatus devised by Mr. Green was merely a light pine box, 22 inches long, 15 inches wide, and 12 inches deep; the bottom was wire cloth, about twenty wires to the inch. It was used without a cover. On the ends of the box, two pieces of two by four scantling were nailed diagonally to the lines of the box, so that floating in the water it was slightly tilted, the side of the box sunk to the least depth, being up stream, so that the wire screen bottom was presented to the current at a slight angle, sufficient to produce a circulation of the water inside of the box, that kept the light shad eggs in gentle motion. In a sluggish tide current the floats are usually nailed on so that from the upper edge of the box to the top of the float in front, there is a distance of 5 inches, and from the upper edge of the box to the top of the float behind, there is 2½ inches. The angle of the floats is, of course, less for a more rapid current, the object being to produce a current that will move the eggs as gently as possible, a more rapid motion being regarded as injurious, especially in the later stages of development when it materially hastens the rupture of the shell membrane, and effects a too premature birth. The wire screen bottom is coated with coal tar, or what is better, asphaltum varnish, both for the purpose of preserving the wire cloth, and for a supposed effect in retarding confervoid growth.

"As soon as the bag of the seine comes near the shore, the fishermen, gathering the lead line and cork line in their hands, gradually work it up to the top of the water, shaking the fish into the bunt of the bag, a boat is brought alongside, and the fish thrown into it with a scoop net, the shad being at once separated from the other species. The operators provided with ordinary six-quart milk pans containing about three-fourths of an inch of water in the bottoms, are in the boat, and taking up the shad one by one, detect at once, by a gentle pressure on the belly of the fish if the spawn is ripe by its free emission from the oviducts. In an unripe one the eggs will not flow at all, and if the eggs are only nearly ready, the extrusion is difficult and in masses, and the fish is rejected. When a female is found, from which the eggs flow in a liquid stream when a gentle pressure is applied, it is carefully taken in the hands of the operator, the left hand applied closely around the tail, and the head of the fish crowded against his body, while with the right hand, a slight pressure is applied with the thumb and finger to the abdomen of the fish, and a stripping movement executed which causes the eggs to flow rapidly into the pan. As soon as it is evident that the spawn is all obtained, the shad is thrown into the basket, it being impossible to preserve the lives of so delicate a fish, even if the utmost care is taken in handling it, but though they are delicate in this particular, and have a very slight tenacity of life when taken from the water, they are a very muscular fish. Experts in fish culture, who handled the white fish and salmon-trout of the lakes, regard them much stronger than the same sized fishes of either of the latter species, and if the utmost pains is not taken to prevent their releasing themselves from the hold, they will flounder and splash in the pan of eggs, and probably throw a large portion out, and damage some of those that remain. In stripping down the abdomen, a great many scales will be removed from the sides of the fish, these if carelessly allowed to fall in the pan, will be an annoyance, as the eggs will adhere to them. They can be gathered and thrown away by an adroit movement of the hand, with a little experience, without making any delay in the operation of stripping the fish. The ova from the female being collected in the pan with a small quantity of water, a slight pressure on the ripe male near the anal opening will force out two or three jets of the milt, which falling into the pan is stirred by a gentle movement of the hand with the fingers spread, care being taken to keep the fingers from contact with the sides or bottom of the pan, as in that case some of the eggs would be crushed. The milt being diffused throughout the water, the pan is left for a few minutes to allow the spermatozoa to come in contact with the eggs. The pan should then be filled full of fresh water, and gently swayed until the water charged with milt is thoroughly mixed with fresh water, the eggs slightly rinsed, when soon afterwards the water may be poured nearly off and the pan refilled with fresh water, and after a slight and always gentle rinsing up of the eggs, the pan may be allowed to stand for several minutes.

The fact has been referred to that the eggs were not discernible to the touch when put into a pan, nor is there any change in this particular if no milt is added, at any rate for the length of time that the eggs have been observed in this condition, a half hour or more. For about twelve or thirteen minutes, when the temperature of the water was about 70° after the milt was added no change was observed, but about this time a careful movement of the fingers in the pan discerned their presence, and in a little more than twenty minutes from the time the milt was applied, they were felt like shot against the fingers, and to an experienced eye, were observed to have increased slightly in size. This stage of their condition is known to fish breeders as the "spawnrising," referring to the greater bulk in the pan from the increase in size of each egg. "The increase in size and hardness continues for several minutes, during which the water is poured off, and fresh water is poured into the pan two or three times, and the eggs gently stirred with the fingers. In pouring in the water the edge of the dipper is placed against the sides of the pan, and the stream directed between the eggs and the sides of the pan, as it is likely to damage the eggs if poured directly down upon them. Mr. Green estimates the number of ova taken from an average spawner, at about 20,000 eggs, and rarely estimates above 28,000 for the most prolific shad. Mr. C. C. Smith, operating for the Connecticut State Commission, estimates an average good spawner, at 50,000 ova. We have not made a test of these estimates, and are not prepared to offer an opinion with reference to the disagreement."

We used wire cloth of twenty-two wires to the inch, instead of twenty, as we found that whereas twenty wires to the inch would confine and protect the shad egg, which is about one-tenth of an inch in diameter, that the young fish would escape and become a prey to the numerous minnows that swarm around the boxes during the day. In estimating the spawn taken during our operations last spring, we followed the method adopted by Seth Green, preferring to be within the mark, and we believe that fully the amount estimated in the tables were turned loose into the streams.

The roe of the shad, as it is served on the table in a compact solid mass early in the season, is a most delicious relish, it is then far from maturity, but it becomes mature as the season advances, and the eggs become larger and more detached from the general mass, the more mature eggs differing in appearance, being more transparent, and losing their golden hue, until when ready to be spawned, the mass has lost its compactness, and the eggs are all detached, and are not then palatable. When the roe has reached this stage of development, it is ready for the fish culturist, who by taking these otherwise worthless eggs, from the fish en route to market, by care and attention produces the numberless fry, which in in time will replenish the waters, which have yielded so liberal a supply of food to our people in years gone by. During the year, we selected three intelligent men, whose occupations had well fitted them for the various duties connected with fish culture, and carefully trained them in handling and transporting fish, and on the approach of spring secured the services of Mr. Alex. Kent, whose experience in the propagation of the fish of the salmon family, well fitted him to take charge of a hatching camp, but to insure the success of our operations, we deemed it advisable to secure the services of one who had had several years experience in hatching shad, as the treatment of the spawn is somewhat different from that of those fishes with which those in the employ of the Commission had been exercised. The proposition contained in the following was therefore made to Seth Green, under whose skillful guidance several men had been made expert in shad hatching:

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St., Baltimore, Md.*
Feb'y 26th, 1875.

MR. SETH GREEN, Rochester, N. Y.

My Dear Sir:—I hope you have duly considered the proposition made you by me in New York, a few days since, which I now repeat with the request that you give me your answer as soon as practicable, as I am anxious to perfect all of my arrangements for the spring's work. I mentioned to you, that I do not feel authorized under the circumstances, and with the present developments in fish culture, to purchase for the State of Maryland the right to use your patent, but as I think perhaps the boxes used by you are more convenient and perfect than any of those since devised or patented, and being desirous to secure your friendly co-operation and good will, I offer you the sum of five hundred dollars, ($500.00,) the extent which our appropriation, etc., permits. In consideration of which amount, you to furnish, for our service in propagation, a practical fish culturist, experienced in taking the spawn of shad, and hatching the same, for the spawning season of Shad and Rock in Maryland waters this spring. You to pay the wages as agreed upon between himself and you, and should we use the boxes, such as used by you in shad hatching, you are not to make any additional claim against the State of Maryland. We to pay all the necessary expenses incurred for this practical fish culturist, from the time he reports, until discharged by us in Baltimore. I have just received drawings of the box patented by Mr. O. N. Bryan, of Maryland. What do you think of it?

Very truly, your's, T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

Rochester, N. Y., March 3rd, 1875.

MR. T. B. FERGUSON,

Dear Sir:—Your's of February 26th, was received. I want to see the work go on in your State. I think I will furnish you a practical man and the right to use my shad hatching box this coming Spring, for five hundred dollars, ($500.00,) I to pay the man's wages from the time he leaves here, and you to pay all other expenses from the time he leaves here and returns. You to send me a check for two hundred and fifty dollars on the arrival of the man, and two hundred and fifty dollars more when the work is done. I see by your reports that shad hatching lasts about 40 days, the man's time should be limited. We can fix that. Let me know if you comply with the above, I will give you a prompt reply, and whether I will do it or not.

I have a full description of O. N. Bryan's shad hatching box before me. It was sent me by Mr. Bryan. It is a direct infringement on my box, and is nothing like as good. It is a clumsy affair, and you can make five of my boxes for what one of his costs, and one man can take care of three times as many of my boxes as he can of his. It is a great deal of work to keep his boxes clean. Look at the complication of his, and the simplicity of mine, and judge for yourself.—There are points in my box that he uses in his, and I don't think he dare use his. There are a number of things in his drawing, that I don't believe could be put in his patent.

Your's, Seth Green.

Maryland Commission, Fish and Fisheries,
192 *N. Charles St.*, *Baltimore, Md.*,
March 8th, 1875.

Dear Sir:—In making you the offer of five hundred dollars, I expected it to cover all expenses, save board, lodging and transportation of man after he reported here. His expenses from Rochester and back, a small matter, I will agree to pay, I am also perfectly willing to make payments as you desire, two hundred and fifty dollars when the man reports, and two hundred and fifty dollars when the work is done. I don't know that I shall want him so long, but will limit his service under our contract to two months. I of course do not wish him longer than we can hatch fish. I think we have come near enough together this year to close, so let's hear from you—Yes or no. The weather continues so cold in the Bay, that I fear we will have a short and late season.

Your's truly, T. B. Ferguson,
Seth Green, Esq., Commissioner of Fisheries.
Rochester, N. Y.

Rochester, N. Y., March 11th, 1875.

Dear Sir:—I accept of your offer, and will send a man when you say the time for him to come. Can you get iron wire sieving, twenty-two wires to the inch, twenty-one inches wide? If so, let me know, and if I can get it cheaper here, I will do so for you. All that is necessary for an outfit except the lumber, is wire sieving and rope for anchors, stones and twine to tie the boxes together, and gas tar to tar the sieving and boxes. It is best to have the man come in time to make the boxes. I will get all of the above or any part of them that you wish; I consider the contract closed, and will send one of my men when you order.

Your's, SETH GREEN.

T. B. FERGUSON, Esq.,
Commissioner of Fisheries, Md.

MARYLAND COMMISSION, FISH AND FISHERIES,
192 *N. Charles St., Baltimore, Md.*
March 29th, 1875.

SETH GREEN, Esq., Rochester, New York.

Dear Sir:—On receipt of your's of the 11th inst., closing our contract, I put my men to making boxes, so as to have everything ready. How many do you think we will need? How many have you been able to use at your camp on the Hudson? The twenty-two inch cloth costs sixteen cents per square foot here. I think when we priced it in Rochester, it was somewhat less. Your's truly,

T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

P. S. We are observing the development of the spawn, and as soon as it approaches ripeness, I will telegraph for your man. What is the name of the man you have detailed for me? Your's,

T. B. FERGUSON,
Commissioner of Fisheries, State of Maryland.

We wrote for the man on April 14th, and Oren Chase, of Rochester, reported for duty on the 20th of April.

Mr. Oren Chase was provided with as complete an outfit for shad hatching as the appropriation would permit; Hatching boxes which had been prepared after Seth Green's model, sufficient to hatch a half-million of eggs daily if the spawners could be obtained, all of which were placed on the Steamer "Leila," Capt. Jesse K. Hines, who had been instructed, through the courtesy of the Oyster Police Board, to render the Commission any assistance in his power. We beg leave here to express our obligations to the Board for assistance they have from time to time cordially rendered, and to Capt. Hines for the agreeable and efficient manner in which he has carried out their instructions.

Mr. Chase, with his assistant, was transferred to the Schooner "Louisa Whyte," Capt. John Forrest commanding, at the mouth of the Patuxent, and was instructed to make a thorough examination of the fisheries of this river, and report their condition, and if Bristol was found most advantageous, to establish himself there, and take advantage of the first ripe fish. Bristol had been selected as a point for our opeaations the previous year, as we found on examination that a considerable number of fish were taken at that point.

As the flat opposite to the wharf was found to be what the fishermen term a "splash" or "shad wash," we hoped to secure a good many spawners. The shad, spawning generally at night, select shallow water, and in pairs, male and female running side by side, come suddenly out of the water as the female deposits her spawn, and the male ejects upon it the milt. This causes a splashing, and the fishermen denominate the locality as "splash" or "shad wash." They are generally the most successful as localities for hatching camps. A tabular statement of the operation conducted by Mr. Chase is herewith submitted. We are under obligations to Mr. W. E. Sunderland, the owner of the fishery, for the many facilities which he rendered us in procuring the spawn from the fish taken in his seine.

About the same time that Mr. Chase was located on the Patuxent, we sent Mr. Alex. Kent to Coppage's Landing, on the Chester, with the necessary equipments for shad hatching. A detail record of his operations will be found in Table. We are under many obligations to Mr. A. Albert, and the officers of the Chester River Steamboat Company for free transportation of ourselves, assistants and stores, and for many acts of courtesy.

It will be seen by reference to the tables, showing operations at the several camps, that little or no success is attained when the water continues below sixty degrees, and after it had risen above eighty-three degrees, showing that the temperature of the water exercises an important influence on the development of eggs, which do not seem to be matured sufficiently to be spawned, until the advancing spring has caused a rise in the temperature of the water. Again, on the increase of heat towards the middle of June, the eggs were either found dead in the ovaries, and without the capacity for fecundation, or after impregnation, died in the boxes, thus shortening the season in which operations can be successfully conducted.

The mortality which was noticeable in these eggs taken at the close of the season, might be attributable to the heat of the surface of the water, and the increased power of the sun. This might be remedied by submerging the hatching boxes.

COPPAGE'S LANDING, *June* 10*th*, 1875.

T. B. FERGUSON, Esq.

Dear Sir :

* * * * * * * *

We have taken about five hundred thousand eggs this week, all of which have looked as well the morning of the second day as the lot you saw when you were down here. But, after they have been in the boxes twenty-four hours or more, a white spot appears on a very large number of them. I have not yet been able to discover the cause. There are hundreds of fish playing about the bottoms of the boxes trying to suck the eggs through. Whether the injury is to be attributed to them, I cannot say. Wroten thinks the water is poisoned with the drainage of fields, and the grasses growing and decaying. Should the lot taken last night do better than those taken previously, I will attribute it to the late rain. The catch of the seine last night was sixty-nine. That of the gillers light. We got nine or ten spawners in all.

Your's, very truly, ALEX. KENT.

On receipt of this report from Mr. Kent operating at Coppage's Landing, the instructions below were given.

MARYLAND COMMISSION, FISH AND FISHERIES.
192 *N. Charles St., Baltimore,*
June 11*th*, 1875.

MR. ALEX. KENT, Coppage's Landing,

Dear Sir :

* * * * * * * *

I have been thinking of the probable causes of the loss of eggs, which your report mentions, and think it might be from the heat of the sun upon the surface of the water. I wish you would try the experiment of submerging a box of eggs, so that they would not be so near the surface of the water. You might do this by taking off the floats from the box you put eggs in, then fasten another box on as a cover, to prevent the egg coming out. Remove the floats of the top box, nearer to the top, and put it in the stream. The floats should be arranged to cause the bottom of the lower box to be inclined to the current like the figure below. I wish I had thought of it sooner, I would have liked to have tried some of my jars, and if it was not so late, would send you some of them with a tank to use as a reservoir. * * * *

Very truly your's, T. B. FERGUSON,
Commissioner.

The fishermen suspended operations at this time, and we were unable to procure any more ripe fish, so had not an opportunity of making the experiment.

By the courtesy of the owner of one of the largest fisheries in the Upper Bay, we examined his well kept books, and found that in 1824, when he worked a seine of only five hundred fathoms, his catch of shad during the season ending May 24th, amounted to fifty-two thousand six hundred and seventeen, whereas, in that of 1871, he took with a seine, one thousand one hundred and fifty fathoms, only seventeen thousand eight hundred. The catch last year was considerably larger, as it was the best shad season for many years. On the 8th of May, his catch was twenty-eight thousand four hundred and nine. The diminution in shad is even more marked than would appear from the above statement, for we learned that twenty-three fisheries above the mouth of the North East, which were in operation some forty years ago, have been abandoned.

It was impossible for us to estimate the number of gill-nets fished in this locality, but at night, the river was illuminated by a thousand lamps, presenting the appearance of a moving city.

We observe that the ripe males or milters made their appearance in advance of the ripe females, and were much more abundant early in the season. Quite frequently towards the close of the season, we found numbers of ripe females, and after taking the eggs, were compelled to abandon them for want of milt to impregnate them. In some cases we used the milt from the Herring, and we also impreguated one or two lots of eggs with the milt from the Rock. After hatching as we had no means to keep them that their development might be observed, we released these Hybrids.

THE HERRING—(*Pomolobus pseudo harengus.*)

This fish is scarcely less important than the shad, and should receive the fostering care of the State. The fecundity of the Herring is so wonderful and their numbers so immense that, it would seem only necessary to protect them, so that they might reach proper spawning beds. The eggs are much more adhesive thanth ose of the shad, and more dfficult to handle, but much can be done towards their increase, by artificial propagation. The spawning season commencing and ending somewhat earlier than that of the shad. Fishing with the herring net should be discontinued earlier in the season.

THE ROCK, OR STRIPED BASS—(*Roccus Lineatus.*)

The aggregate number taken during the year, the high price which it commands in our markets as well as its game qualities, and the excellent flavor of its firm flesh, places this among the most important of our native food fishes. We have made several efforts to obtain reliable statistics of the number of pounds annually produced in the Chesapeake Bay and its tributaries, for we believe that the value of this fish, and the amount of its contribution to the food resources of our State is much underestimated. Though true that it is not at any time taken in such great numbers as the shad and herring, yet its season extending through a greater portion of the year, the aggregate yield makes it of scarcely less importance than these fishes.

They are migatory to some extent in their habits, but it does not appear that they are impelled by the same necessity, for fresh water, for the purpose of reproduction, which causes the above mentioned fish to visit our rivers yearly. We are inclined to believe that their appearance is rather in search of food. They are taken of great size in the shad and herring seines, and are called "rollers" by the fishermen who make war upon them, as they believe that they consume a great many shad and herring. We doubt very much the wisdom of this warfare, for even if the Rock was no value as food, its predatory instincts must cause it to play an important part. Following the schools of shad and herring, they consume the less vigorous which become their easiest prey, leaving the strong and most vigorous to perpetuate their own race. There seems to be a peculiar need for this weeding out by predatory fish, as the shad and herring are not combative as many other species with whom the favors of the female are often the prices of hard fought battles. In visiting the several fishing shores we examined hundreds of Rock, but could not find a single ripe female, and instructions were given Messrs. Chase and Kent to observe this fish closely. They however met with no better success. We found many ripe male fish, and as early in the season as the 27th April, and as late as the middle of May. The milt was used to fecundate the eggs of the shad, when milt shad could not be procured. The fact that milters are found in April, would indicate that they spawn about that time, or perhaps later, as with shad and other fish, the milters are found ripe in advance of the roe-fish.

We deem it of the greatest importance, that the time of spawning be accurately determined, and if possible the character of spawning beds, etc. To enable us to procure the ova and increase this fish, we propose to select a suitable locality, procure the fish in their first abundance in February and confine them until their eggs are developed. Although practicable for shad, this can be accomplished at no great cost. At the Bucksport establishment, the Salmon are taken in the shore seines in the Spring, transferred to a fresh water pond, and kept until ripe in the Fall, when the eggs are taken and hatched. In this way we confidently hope to be able to procure and develop many millions of Rock during the coming Spring.

THE WHITE PERCH—(*Morone Americana.*)

This excellent pan fish is well and fovorably known in our markets, it is still very abundant, but steadily diminishing notwithstanding its great fecundity. The spawning season being somewhat earlier than the shad, and different localities required as well as modified hatching apparatus. We did not feel warranted in incurring the additional expense of a separate hatching station. We, however, made a successful experiment in hatching them, and are satisfied that they can be greatly increased by artificial propagation.

THE BLACK BASS—(*Micropterus salmoides.*)

Though of recent introduction into our waters, it has become so plentiful, and plays so important a part in the food supply of the interior of the State, that we refer to it among the native fishes. The black bass has not, nor is it likely that it will be so constantly found in our markets, as those fish which find their subsistence, and obtain their growth in the sea, where they find an inexhaustible supply of excellent food. But the bass fills, and well fills a long felt deficiency of fish food in the interior fresh water, occupying the middle ground between the rapid leaping brook, the home of the speckled trout (*Salmo fontinalis*) and that frequented by the white and yellow perch. They furnish wholesome fish diet, and recreation to those who before their introduction had only the Cat, the Sucker, the Fall fish and a few minnows.

Although never taken in sufficiently large quantities to be found in central markets, yet there are hundreds of families residing in the region drained by the Upper Potomac, who are saved thousands of pounds of meat annually by the introduction of this wholesome change of diet. We, through the kindness and aid of Hon. Arthur P. Gorman, President of the Chesapeake & Ohio Canal, who rendered us every facility, when the water was taken from the canal in December, 1874, procured some five hundred black bass, many of them large fish, with which we stocked many of the rivers. We hoped to procure a much larger supply, but when we recollected that the abundance in the Potomac is the result of the introduction of not more than one hundred in 1854, we may expect excellent fishing in the streams stocked in four or five years, if the fish are protected. It has been asserted that they had destroyed all other fish, and were themselves diminishing, we, however, found quantities of small fish in seining the deep places in the canal, and but few bass. We attribute the diminution of the bass in some of the upper waters to the fact that on the approach of cold weather, they move down stream, seeking the deep holes in which they lay dormant during the winter. Having passed over the dams and Great Falls in their downward journey they find it impossible to return, so the upper regions are each year deprived of many of their fish. There would be a more equal distribution if these obstructions were provided with proper fishways.

TROUT—(*Salmo fontinalis.*)

This fish, so much prized by the angler and epicure, inhabits the clear mountain streams and rippling brooks, in which there is to be found a limited supply of food. This renders it impracticable to make them so plentiful, as to have any influence on the food product of our waters.

This consideration decided us not to devote any portion of the appropriation to stocking streams with this beautiful fish, but to devote our means to multiplying those larger, more prolific and more easily raised fishes which find their food in the ocean, and waters more abundantly supplied with insects, and crustacea, that we might accomplish the greatest possible results. We have received constant applications from all parts of the State for trout for streams and ponds fed by cold springs, so we have made preliminary arrangements should the necessary means be placed at our disposal, to distribute from fifty to seventy thousand trout immediately. Our hatching facilities are such that we can at little or no additional cost, turn out hundreds of thousand fry yearly, should we be enabled to procure storage ponds for the breeding trout.

The cultivation of the lands which are drained by trout streams, has in our opinion tended greatly to destroy the trout, almost as much as excessive and indiscriminate fishing. The eggs of the trout are of considerable specific gravity, and are deposited on the gravelly beds in the brooks during the latter part of October, and in the month of November. They are hatched in this latitude in from forty to sixty days, during which time they are constantly exposed to the danger of being covered up and smothered with mud washed down from the newly ploughed surrounding fields, nor does the danger from the washing of the fields end with this period of development of the egg, for after the young fish has freed itself from the egg, it is almost as helpless during the absorption of the umbilical sack. We have in wading trout streams in Howard county, sunk ankle deep in mud washed in from the surrounding ploughed fields.

The washings are more fatal to the eggs of the Salamonidæ than perhaps any other, as they, after depositing their eggs leave them, whereas the black bass attend their nests, keeping them clear of sediment by a gentle movement of the fins, until the offspring are free from the egg, and able to take care of themselves. The length of time required for the development of the eggs, renders it quite improbable that the streams in highly cultivated farms will ever become abundant with trout even if all fishing was stopped, unless the eggs are artificially hatched.

We are of opinion that the only effective method of keeping up trout streams, is to hatch out yearly and keep until the sack is absorbed a sufficient number of trout, and turn them into the stream. This can either be done by the State from its central hatching house, or by individuals living on such streams.

THE BROOK TROUT—West of Rocky Mountains—(*Salmo ridea.*)

We received a few eggs of this variety of the Brook Trout, which differs from our "Salmo fontinalis," in that it is marked with black spots instead of red. This fish is described as being of delicious flavor, it rises boldly to the fly, takes it greedily, is active, plump, and affords good sport to the angler. The eggs were received from California by Professer Baird, through the mail, and remailed to Mr. Ferguson in Baltimore. They were successfully hatched in his library, and have been placed in a pond in Druid Hill Park, which had been prepared by the Park Commissioners, for fish culture, near the "Crow's Nest." Many of them were washed away by severe rains before the completion of the ponds. The remaining fish are doing well and growing finely, perhaps more rapidly than their cousins of the Atlantic slope.

SALMON—(*Salmo salar.*)

Prof. Baird having presented the State with eighty thousand salmon eggs, from the Bucksport breeding establishment, which is operated by the U. S. Commissioner, and the Commissioners of the New England States, and superintended by Mr. Charles G. Atkins, we placed them under Mr. Kent's care, at his hatching house at "Green Spring," and when ready for distribution, disposed of them as appears in the table. We are not hopeful of any results, as this variety is an inhabitant of much colder waters. Those which we have kept over, have not thrived as the Western variety have.

THE SALMON OR LAKE TROUT—(*Salmo namaycush.*)

We obtained a few thousand eggs of the Salmon Trout from the State of New York, some of which were hatched at the mansion in Druid Hill Park, by permission of the Park Commission, but unfortunately, during the severe cold in February, the pipe which furnished the jars with water froze, and the fish and eggs were all lost. Some two thousand were successfully hatched in the library of one of your Commissioners in Baltimore, and about one thousand of the young fish were placed in Druid Lake by permission of the Water Board—the others were placed in small streams tributary to the Gunpowder, in Baltimore county. The growth of those kept over from last year, has induced your Commissioners to make the experiment of the introduction of the Salmon Trout on a larger scale. We, have therefore, obtained some forty-five thousand ova from Seth Green, Superintendent of the New York Commission, which are now in the hatching house in Druid Hill Park.

LAND LOCKED SALMON—(*Salmo sebago.*)

The game qualities of this fish, which resembles the Maine Salmon so closely, that it is still an undetermined question with naturalists, whether it be a separate species, have induced your Commissioners to request some ova from the U. S. Commissioner, that their intorduction may be attempted. Prof. Baird has promised to present us with a lot of the eggs, should he be successful in procuring a supply. This Land Locked Salmon attains the size of from six to eight pounds, is of excellent flavor, takes the fly readily through a good portion of the year, and is perhaps the gamest of his family.

CALIFORNIA SALMON—(*Salmo quinant.*)

This is the most important of the fishes which have been unknown to our waters, and have been introduced by us. We have expended a large portion of the appropriation, and devoted much care and attention to stocking our streams with this most valuable fish, as we have every reason to believe that their naturalization is entirely feasible, and our efforts will be crowned with success. The habits of this fish will cause its successful introduction to be felt by the greatest number of the people of the State, and throughout the entire course of the streams, from the Bay to their mountain sources. On their return in the Spring from the sea, where they attain their growth and excellent flavor, they will be taken at the mouths of the rivers, and throughout the regions of tide water, in nets and seines, and those which escape and reach the upper waters, which they select for spawning, will remain until Autumn, when they deposit their spawn and return to the sea. During their sojourn in fresh water they will be taken by anglers. In tables following, will be found a statement of the number of California

Salmon turned loose in the waters of the State, from which it will be seen that in the winter of 1874, we made a very general distribution into the rivers of the State having their sources in the mountain regions. The few thousand which were placed in the rivers of the Eastern Shore, whose sources are in the more level country, were simply an experiment without hopes of success, but from some experiments made during the year with the California Solmon, we are almost hopeful of success even in these rivers. As the San Joaquin valley is about isothermal with the Savannah, we believe that the Salmon will not suffer for want of cold water in the Potomac, Patuxent, Gunpowder and Susquehanna. We quote from the report of the Commissioners of California for 1874 and 1875, showing the results obtained from their labors, and the importance of this as a food-producing fish.

"Salmon were more plentiful in the Sacramento river during the season 1875, than ever before since Americans had knowledge of the country. This is attributed to the close season which prohibits the taking of Salmon between the first of August and November first, as also to the quantities of young Salmon turned loose from the hatching establishments. It is anticipated that after three years there will be found more profitable fishing than has hitherto been known. An appropriation of from six to ten thousand dollars yearly, is asked for instead of the pittance of twenty-five hundred dollars granted."

"Much attention is given to the Sacramento Salmon (Salmo quinnat) by scientists and by fish culturists in other countries for the reason that it comes into rivers to spawn in latitudes much lower, and in waters much warmer than any other variety yet known. Large numbers pass up the San Joaquin River for the purpose of spawning in July and August, swimming for one hundred and fifty miles through the hottest valley of the State, where the temperature of the air at noon is rarely less than 80° Fahrenheit, and where the average temperature of the river, at the bottom, is 70°, and at the surface 80°. The Salmon of the San Joaquin River appear to be of the same variety as those in the Sacramento, but average smaller in size. Their passage to their spawning grounds at this season of the year, at so high a temperature of both air and water, would indicate that they will thrive in all the rivers of the Southern States, whose waters take their rise in the mountainous regions, and in a few years, without doubt the San Joaquin Salmon will be transplanted to all of those States."

"The weight of Salmon caught during the past season in the waters of the Sacramento and San Joaquin Rivers, is estimated at 5,098,780 pounds, in addition to 92,000 pounds of fresh Salmon shipped in ice to the New York market."

We received in October, 1874, about two hundred and fifty thousand eggs of the California Salmon, a gift to the State from Professor S. F. Baird, U. S. Commissioner, from the eggs collected under his direction, by Mr. Livingston Stone, at the U. S. Hatching Camp on the McLoud River, California. The eggs arrived in wretched condition; as they had not been iced on the journey, many of them were prematurely hatched, and the masses of eggs were generally heated.

The good eggs were placed in the hatching troughs in Mr. Kent's establishment, and hatched in a few days, the sack was absorbed in about thirty-five days, and the young fish distributed as shown in the table, from which it will be seen that one hundred and forty-four thousand (144,000) of this valuable fish were placed in the several rivers of the State.

On the 13th of October last, we received seven crates, containing each eighty thousand eggs, a liberal donation from Professor Baird to the State of Maryland, from the same source; these were well iced on the journey and reached Baltimore in excellent condition. The hatching house in the course of erection in Druid Hill Park, was not in a sufficiently finished state to receive them, so we placed the crates in the ice house near the "Duck Pond" in the Park, and kept them surrounded with ice for about ten days, until sufficient apparatus was put up in the hatching house to receive them.—When they were put down notwithstanding the long delay, they were found in excellent condition. We were compelled to crowd the eggs very much, and move them from time to time as the work in the hatching house progressed, which caused the loss of a good many eggs, but notwithstanding the disadvantageous circumstances we have been very successful, and have a large number of fish for distribution. Our work with this large number of eggs, has proved the hatching house a thorough success, and demonstrated its great capacity.

SMELT—(*Osmerus mordax.*)

It is a desire of your Commissioners to attempt the introduction of this savory little fish into the waters of the State. Should we succeed, they must be a valuable addition to the food resources of the numerous rivers and streams of the Eastern Shore.

In the localities where they abound, they rush up the streams in countless numbers in the spring, and are taken in seines, and although averaging but five or six inches, they are much sought after on account of their excellent flavor.—Although taken in large numbers in seines, they bite readily at the hook when baited with shrimp, and other crustaceans, afford excellent sport, and they are said to rise readily to the fly.

They will be an excellent exchange for the tasteless gudgeon, so much sought after by youthful anglers.

BUFFALO FISH—(*Bubalicthys bubalus.*)

It is very desirable that this, the largest of the suckers (Catostomidae) be introduced from the Ohio, into the Potomac, and other rivers inhabited by the Black Bass. Being very prolific they will furnish a supply of food to the Black Bass when young, and attaining a considerable size as adult, from two to three feet in length, they will be too large to fall a prey to them, and those escaping the perils of youth, will keep their race from being exterminated.

They will, on account of their great size, be of no small value as a source of food to those living on the streams.—Although not so highly prized as the Trout, Black Bass, Salmon, etc., they are certainly better than many of their smaller cousins which are sought after by those who have not the White Perch, Sheep's Head and Tailor at their doors. They are themselves by no means a predaceous fish, and we therefore strongly urge their introduction.

THE CARP.

Professor Baird, having decided to attempt the introduction of the European Carp, engaged the services of Mr. Rudolph Hessel, an eminent Pisciculturist to proceed to Germany, procure from the ponds bordering on the Danube, and transport to the United States, the best varieties, and also arranged with your Commissioners to receive the fish brought out by Mr. Hassel, and breed them in ponds which has been prepared for the purpose in Druid Hill Park. We quote from the report of the United States Commissioner, to show his estimation of the importance of their introduction. "Sufficient attention has not been paid in the United States to the introduction of the European Carp as a food fish, and yet it is quite safe to say that there is no other species that promises so great a return in limited waters. It has the preeminent advantage over such fish as the black bass, trout, grayling, etc., that it is a vegetable feeder, and although not disdaining animal matters, can thrive very well upon aquatic vegetation alone. On this account it can be kept in tanks, small ponds, etc., and very much larger weight obtained, without expense, than in the case of the other kinds indicated.

It is on this account that its culture has been continued for centuries. It is also a mistake to compare the flesh with that of the ordinary *Cyprinidae* of the United States, such as suckers, chubs, and the like, the flesh of the genuine Carp (*Cyprinus carpio*) being firm, flaky, and in some varieties almost equal to the European Trout."

The Honorable Roger North says: "This is the most valuable of all kinds of fish for stocking ponds, because of its quick growth, and great increase. If the feeding and breeding of this fish were more understood and practised, the advantages resulting would be very great, and a fish pond would become as valuable an article as a garden.

Mr. Foster mentions seeing in Prussia, two or three hundred Carps, of two and three feet in length, and one five feet long, and twenty-five pounds weight; it was supposed to be about sixty years old."

The Carp family are among the least carnivrous fishes, their food being chiefly soft vegetables, or decaying organic matters, and at times worms and insects. They are easily and cheaply kept, finding their food in any pond which has been under water any length of time, and stocked with aquatic plants. Another very decided advantage they have over the salmon and herring families, is their capacity of living in warmer and more stagnant water, and in fact their capacity to live for a time almost without water. The openings between the gills are very much greater in the above mentioned families, whereas in the Carps they are partially closed by a membrane, which, by retaining moisture, keeps the gills longer in a condition to abstract oxygen from the air, and enables them to live much longer out of water.

Unfortunately for our enterprise the weather was intensely hot in Europe during Mr. Hessel's journey to the coast through Germany, and during his passage across the Atlantic. He lost all but twenty-five, of some three hundred and seventy-five which he started with, before reaching New York, and those were in such bad condition, that two more died before they could be transferred from the tanks in which they made the journey to the milk cans provided for their transportation from New York to Baltimore. He reached the carp ponds in Druid Hill Park, with three common Carp, (Cyprinus Carpio,) one of that variety which is destitute of scales, (Specularis,) and is so highly prized. Twelve Tench, (Cyprinus Tinca,) and seven golden Tench,(Tinca Auratus,) the latter are prized highly as food, attaining rapidly a weight of twelve or fifteen pounds. They are also very ornamental, being of a rich golden colour. We regret that of this importation, only six Tench and two golden Tench survive, these are male and female, and we hope that we will receive some increase from them next spring.

Professor Baird, having sent one of Mr. Milner's assistants, Mr. Welsher, with a lot of shad eggs which were intended for the German Government, instructed him to repeat the attempt of transporting the carp, etc., to America on his return. The breeding season having arrived, the owners of ponds in Germany would not permit the fish to be disturbed, so Mr. Welsher was not able to procure a very full assortment, but transported successfully and delivered to your Commissioner in New York, fifty carp, variety *Carassius gibelio* or Prussian carp, and forty-seven Orfus (Idus Melanotus) which is a beautiful golden fish, surpassing the common gold fish in colour and form. A brilliant red colour covers the upper portion of the body, and the belly portion is white, it is much more active, lively and graceful in its movements, and attains a much greater size.

It is the intention of the United States Commissioner, to make yet another effort to get a stock of good breeding fish, of the best varieties, to add to our already valuable importations. The most beneficial results are confidently expected from the introduction into our waters of those which we now have, as soon as their increase will permit of their being distributed.

BAY OR SALT WATER FISHES.

By reference to the list, in Appendix, of fishes, which are known to be found in our waters, it will be seen that we are peculiarly rich in this class of food fishes. They, however, are not found in such abundance as formerly. Those, such as our tailor or blue fish (Pomatomus saltatrix) and the trout (Cynoscion regalis) which are attracted by the herring, alewife and small fish, will, no doubt, appear in greater numbers, as these are made more plentiful, diminish still more as these decrease. The propagation of those fishes, which come up from salt water for the purpose of spawning, will be indirectly the means of increasing those fishes which are attracted in our waters by them. We can not with the present lights of fish culture, suggest means for their direct increase by artificial propagation, but understand that important experiments are being made in the development of the ova of the sheepshead, and other salt water fishes, by the U. S. Commissioner, and we will hold ourselves in readiness to benefit by any discovery which may be made in this direction.

TERRAPIN—(*Malacoclemys palustris.*)

Although one of the well-known reptiles of Maryland, yet as a food product of our waters, we do not think it without the province of your Fish Commissioners to give the celebrated diamond-back a passing notice, as we believe that it is of the greatest importance that steps should be taken to increase the much diminished and rapidly diminishing supply of this most excellent luxury of our Bay. Nowhere on the coast are they found in such excellence as on the Chesapeake Bay, although somewhat widely distributed.

It is a source of great regret to us that we have not the means to establish a model terrapin farm, so that the feasibility of cultivating this great luxury, might be clearly demonstrated to those who might visit it, and stimulate the establishment of other enterprises throughout our bay coast. The liberality of the City of Baltimore, and her Park Commissioners, has placed it in our power to daily instruct the numerous persons who visit Druid Hill Hatching House in the process of hatching and rearing trout, another of the luxuries of the water, which are fast becoming unknown in waters in which they were once plentiful.

There are hundreds of localities admirably situated in our terrapin-producing regions, which could be made more productive, acre for acre, than the best surrounding land, by the establishment of terrapin ponds.

These ponds might be constructed by fencing off the head of one or two of the numberless inlets which occur so frequently in our lower bay, or throwing fences out into the creeks, by driving boards down some seven or eight feet into the mud, so as to prevent the possibility of the terrapin burrowing under them. The bottom of the pond should shelve off to a depth of six or eight feet deep in the creek or inlet, and the fence should enclose a portion of sand bank extending some dozen or more feet beyond high water mark in which the adult terrapin can deposit their eggs. During the winter season there should be a partition fence to prevent them from coming into shallow water, as the ice which is formed on the flood sometimes falls when the tide recedes, and crushes those which are near shore. During the summer, floats should be anchored out in deep water, on which the terrapin could enjoy the sun, and the fence should be removed, so as to allow them to reach the shore during the laying season, which is in the latter part of June or in July. In addition to the larger ponds in which the stock terrapin are kept, there should be a smaller pond which could be used as a nursery.

The female, when ready to lay her eggs, comes out of the water beyond high water mark, and excavates with her hind legs a neat hole in the sand, deposits, carefully covers, and leaves her eggs. We found nine in a nest, which we examined, at the mouth of the Patuxent last summer, but we are disposed think that this was an unusually large number. In the ponds for artificial rearing, the sand might be placed in tanks, which could be removed at the close of the laying season to the nursery pond, from which should be carefully excluded all fish, especially minnows, as they are great enemies to the terrapin in its earliest stages.

The eggs remain in the sand some two months or so, until hatched. For some time after they are free from the shell, they show no disposition to take to the water ; at this period they are very vulnerable, as they are encumbered with an umbilical sac, which present a salient point of attack to small fishes; they should be carefully protected from these casualities and provided with soft mud in which to bury themselves during their hibernation.

Even after the umbilical sac is absorbed, there must be a great number destroyed when at large, by the larger fishes. We found a terrapin evidently of the previous summer's brood in the stomach of a catfish, taken in the Upper Bay last Spring.

There a great many terrapin consumed each year, which could very profitably be kept for two or three years in ponds, as above described, and fed upon small fish during the summer, when the alewife, et cetera, can be taken in great abundance in the terrapin regions.

DESTRUCTION OF SMALL FISH BY SEINES.

We find that the destruction of small fish is immense at every haul of the seines, and yet it is exceedingly difficult to devise means to avoid it, for if the meshes used were larger, the herring would escape, and in landing the seines as is customary in our waters, it is impossible to separate the fish and save the small ones alive to be returned to the waters. There are, therefore, numbers of small fish termed "offal," which would be valuable for food if unmolested for another year, accumulated in heaps on the shores to make their decaying presence felt by nauseous oders, or are hauled out on the land, an imperfect fertilizer. The only means which we can suggest by which these fish could be saved is the construction and use of the fish ponds, such as are operated on the Detroit River, and thus described by Professor Milner, in the Report of the United States Commissioner to whom we are indebted for accompanying plate.

THE "PONDS" OF DETROIT RIVER.

"These fisheries, known as ponds, are among the most extensive establishments of the lake. Large numbers of white-

fish are kept alive in them, from the fall of the year, to late in the winter, when they are taken out, and sold in the market at good prices. The best ponds are situated at islands in middle of the river, where there is an ample circulation of water, keeping the fish in a vigorous, healthy condition for months.

"The pond is merely an inclosure in the river, made by driving piles close together, and afterward sheathing the inside with planks, leaving joints of three-quarters of an inch in width, to allow the free circulation of water through the pond. At one end of the pond a gate is put in, hinged at the bottom of the river to a mudsill, and the upper portion, floating at an angle of about 45°, project a foot or more above the surface, closing the entrance to the pond. By pushing the gate beneath the surface, with a pole, it is opened to the extent of one, two, three or more feet, according to the depth the top of the gate is pushed down. The accompanying plate represents one of the best arranged and conducted fisheries on Detroit River. The buildings for the men, the net house, and the store house, with the windless sheds, are all in view. It will be seen that the fishing is carried on by sweeping a seine in front of the pond, that is drawn in by horse power. When the brails come on shore the men haul in the seine until the bag is reached, when the leads are thrown over the top of the gate, which is then pushed down, leaving an open space at the surface, of two feet, through which the fish are emptied into the pond, without being touched by the hand or taken above water.

"At this fishery, the seines in use are about one hundred rods long. A gang of thirty men are employed from September until the middle of November, working in two relays, night and day, and averaging about one sweep of the seine every hour. In each pond, from twenty-five to forty thousand white fishes, and a number of other species, are penned up every season."

By making the spaces between the piles sufficienty large to allow the small fish to escape, but small enough to retain the marketable ones, many would be left to increase in size, which are now wantonly destroyed. The use of such ponds would be of great economy to fisheries, irrespective of the prospective benefits which might be derived, as they might, by keeping the fish alive, save the use of ice, and instead of having boats running every day to market, whether full or not, they could have certain days to send the produce of several days catch to market, and neighbouring fisheries could enter into co-operative transportation arrangements.

We deem the adopting of the pond arrangement, of such advantage to our people, by saving the "offal," to become edible fish, that we recommend that the State should offer inducements for their construction as hereinafter suggested.

The floats or batteries, such as are operated on the flats in the neighborhood of Havre-de-Grace, might be readily arranged, so that the seines could be landed as in the ponds described, and the smaller fish allowed to escape. The flat of Messrs. Sadler & Gilbert, who operate a seine of 800 fathoms and employ about 40 hands, is simply a large raft 60x80 feet, of sufficient buoyancy to be moved to any desirable point on the flats, where it is secured into position by piles, which pass through wells in the raft. On the float, are quarters, stabling, a storehouse, salting sheds and windlasses. Each of three sides of the float is provided with an apron 45 feet wide, which is held in position by heavy chains, and can be raised or lowered at will. This apron provides an inclined plane, up which the seine is hauled in the same manner in which shore seines are. The selection of the side on which the hauling is made, is determined by the direction of the current, wind, etc. The fourth side is used as a wharf.

With a view of ascertainiug the condition of our waters, their adaptability for the introduction of foreign species, and their capacity of furnishing food, etc., for them, we have examined carefully the rivers of the State, commencing in the extreme North West, among the tributaries of the Youghiogeny, and have completed our examination, as far South and East as the Chester. We have made collections of the fishes found in them as even the smallest minnows, and all animal life found in the waters, are of importance as furnishing food for the larger food fiehes. We have deposited these collections in the museum of the Maryland Academy of Sciences—the Society having furnished us with the alcohol. In the appendix will be found a descriptive list of the species which are known to inhabit the waters of the Chesapeake Bay and its tributaries, carefully prepared by, and under the superintendence of Prof. P. R. Uhler—the able President of the Academy. We hope that in our future collections, we will be able to bring together a complete representation of the fishes of our waters, and believe that many species will be added to our list.

FISH-WAYS.

In order that we might better make the examination required in section 2nd of chapter 150, Laws 1874, we selected a time when the Potomac River was very low, to make a survey of the Great Falls

President Arthur P. Gorman, who has ever manifested the greatest interest in the work of the Commission, kindly placed his packet at our disposal, and furnished us with the necessary transportation up the canal. We invited the Commissioners of Fisheries of Virginia to make the survey with us, as both States are equally interested in having an efficient fish-way constructed over this barrier, to the ascent of fishes from the tide water to the upper portions of the States, drained by the Potomac and its tributaries. Colonel A. Mosely representing his Commission accordingly met us at Georgetown, D. C., on the 12th of July, and we proceeded up the canal in President Gorman's boat, accompanied by his courteous Paymaster. Mr. Gambrill. By taking the route by water, we were able to examine the Little Falls, and other points on the river. Major Richard Randolph, Engineer of Baltimore and Ohio Railroad, had kindly promised his valuable aid gratuiously, and had secured for us the services of two of his assistants, Messrs. Gordon and Jones, who, under his able guidance, ran the necessary lines, and took the levels. We are greatly indebted to Major Randolph for his experienced advice, and his assistance in making this important preliminary survey, and beg to submit his report:

T. B. FERGUSON,

Dear Sir:—I make for you this memorandum of the result of our observations last summer at the Great Falls of the Potomac, where I had the pleasure of witnessing your dexterous and graceful handling of the fly-rod, while your obedient oarsman quickly or steadily propelled your light boat among the thousand islets of the fishing grounds; mounting and descending the numerous rapids with almost the same facility as that of game which you were pursuing, and presenting to me, as I stood admiring in the distance, a picture which has left a deeper impression upon my memory, than did the luxurious repast afforded us that night by your numerous captures. I saw enough to convince me of the great importance of the enterprise you have in charge, of seeing that the injunction of "crescite et multiplicamini," inscribed upon the arms of Maryland, and which seems to be particularly directed to the attention of the man with the fish, is carried out. And I hope that you will make it appear that the great barrier of the falls which prevents our finest fish from ascending higher, can, at a moderate cost, be circumvented.

The broad bed of the Potomac, above the falls, with its islands and innumerable projecting points, is formed by a horizontal ledge of granite rock, which, at the falls, is cleft across the entire bed by a deep fissure, while lesser fissures at right angles to this present several channels, for the escape of the waters to the bottom of the chasm in as many series of tumbles.

The main volume flows through the second fissure from the Virginia shore, falling fifty feet in about eight hundred feet of distance, the last tumble being nearly a perpendicular fall of about fifteen feet, separated from this by a wall of rock, a smaller volume rushes between it and the precipice forming the Virginia shore. Both of these torrents are received in a deep basin and proceed from thence, and following the transverse cleft to the Maryland side, where it deflects nearly a right angle, escape by a longitudinal cleft of about the same width, flowing at a moderate velocity.

Another of these fissures leading into the transverse chasm marks out the Maryland shore, and formerly conducted another volume of water, and was called the Little River. But since the erection of the dam of the Washington Water Works from an island in the middle of the river to the Maryland shore, no water flows in this channel except what is let out of the waste weir. The space intervening between the currents next to the Virginia shore and Little River, is called Falls Island. During floods the waters find their way over nearly all of its rugged surface, and are, for the most part, precipitated into the chasm below, through another of these parallel fissures near the middle of the lower end of the island. Each of these fissures present at their entrance into the transverse chasm nearly the same declivity.

The waters, at ordinary stages, after being precipitated by any of these channels from the ledge above, all find an exit by the same channel, and which flows in the same line as that of Little River produced. In its higher stages there are two other out-lets, one following the transverse cleft to its end on the left, where deflecting a right angle to the right, it follows the base of the wall built to sustain the Chesapeake and Ohio Canal. The other runs in a straight line between two rock walls, with a width of about forty feet, and begins at the transverse fissure about five hundred feet east of where Little River enters it. Both reach the main channel about eight hundred feet below this point.

The first place we examined, with a view of providing a fish-way, was the location of the old Potomac Canal on the Virginia side. But this being upon ground twenty feet higher than the top of falls, and emptying into the river at a point ten feet lower than their foot gave thirty feet of extra elevation to be overcome. And the distance where the numerous locks were clustered, was so short as to preclude the idea of making available any of the old work.

Our next consideration was the erection of wooden fish-ways leading from the basin at the foot of the falls where the shad congregate in their baffled efforts to ascend higher, and provided with the usual zig-zag or spiral compartments to require the water to traverse a sufficient distance to reduce its velocity enough to be overcome by the fish. But when we saw on every side, the clean and bare walls of rock, and the rugged ledges where nothing had been allowed to remain, except some immense boulders or some temporary deposits of sand in protected hollows, it was easy to realize the power of the Potomac, when its swollen floods plunged over and through them, and the grinding effect of the glaciers which are so often driven before the accumulated water. We could see no place where such unsubstantial structures could be fixed without being brushed away like straws. It seemed that the only practicable and secure passage-way for shad was, that which could be afforded by cutting out of the rock a channel having a rate of descent sufficiently moderate to enable the fish to ascend.

To ascertain the best mode and probable cost of accomplishing this, the engineers who accompanied us traced two lines with the transit, and found the elevations of the points with the level. Both of these commenced at the dam of the Water Works; one followed the edge of Falls Island to the shad basin and byond, the other followed the course of Little River to the point where the main volume deflecting to the right, leaves the great transverse fissure. These lines with their profiles are laid down upon the map, which has been made to illustrate your report.

The basin where the shad are arrested, is so close to the ledge from which the waters are precipitated, that any practicable grade could not be cut out from that point without an inordinate expense; as a grade ascending at the rate of four to the hundred following the lowest part of the channel, would require a rock cutting fifteen hundred feet long, with a depth of twenty feet in the middle, which would be greatly increased by any lateral deviation in consequence of the higher ledges on each side. Besides the whole of the blasting and removal of the rock would have to be carried on in the face of the torrent, unless the dam of the Water Works should be extended to the Virginia shore, and all the water be allowed to escape by way of Little River.

From what I have read in the report of the United States Fish Commission, which you were kind enough to send me, I am inclined to believe, that if a considerable volume of water were made to issue obliquely into the main channel, at a point lower down the river, and at a velocity, although not great enough to prevent the ascent of shad, yet, much exceeding that of the larger quantity in the main channel; that most of the fish would be attracted by the superior current, and be induced to follow the artificial water-way, and if a barrier were thrown across the main channel, just above the confluence, then all of them would take that course.

I think that such a fish-way can be constructed at a very moderate expense, by following the route of Little River and, what is apparently, a continuation of the same cleft in the ledge below the great transverse cleft.

I have estimated the cost of such a way, supposing a grade descending at the rate of four in one hundred to be adopted. Although such a descent would produce a velocity far too rapid if the channel had straight and smooth sides, and bottom with much depth of flow; yet, if the water had to struggle through and over ragged projections of rock, or fragments too heavy to be moved, it would be so impeded that it would not obtain a general velocity that could not be easily overcome by the fish; while everywhere they would find either a resting place or a solid point against which to react in their endeavors to stem or mount the current. I have frequently observed in long stretches of mountain streams descending nearly uniformly at, at least, as great an inclination as this, that the Speckled Trout had no difficulty in mounting, and that I could easily keep up with floating particles, without exceeding a trot on a pathless ground.

An excavation beginning and ending within a distance of seven hundred feet, and of a depth in the middle of about ten feet, containing less than five thousand cubic yards of rock, will establish the grade of four in one hundred as a maximum in the bed of Little River, and give it a minimum width of thirty feet. This will coincide with the present bottom of the transverse fissure to be crossed obliquely, and which would then only require the rock from the excavation to be placed on each side to retain the water there, and to conduct it into the cleft in the ledge below, whose bottom with a width of about forty feet descends from there gradually to the main channel, at a point eight hundred feet further down where it is about one hundred feet wide, and flows with a gentle velocity. One dollar per cubic yard would be a full price for this excavation, and five thousand dollars would be an ample allowance for all the expenses in making the fish-way complete, making a total estimate of ten thousand dollars.

At periods of very high water, of course, the effect of the artificial channel would be greatly diminished; but I imagine that although the fish may be started in their migration by the Spring freshets penetrating far down into the salt water, yet, that by the time they have reached the Great Falls, the river will have subsided to its ordinary stage, when a gill-net stretched across just above the fish-way may serve the double purpose of making a remunerative catch, and of diverting the rest into the ascendable channel. The supplying of the proposed new course with the requisite volume of water, depends upon the Government's completing the dam of the Water Works, and providing a sufficient waste-way near the Maryland end.

If, however, that period may be deemed too remote, an additional expense of about four thousand dollars will connect the channel of Little River with the main body of water, by means of an excavation across the upper end of Falls Island, which would make the total cost of this route fourteen thousand dollars.

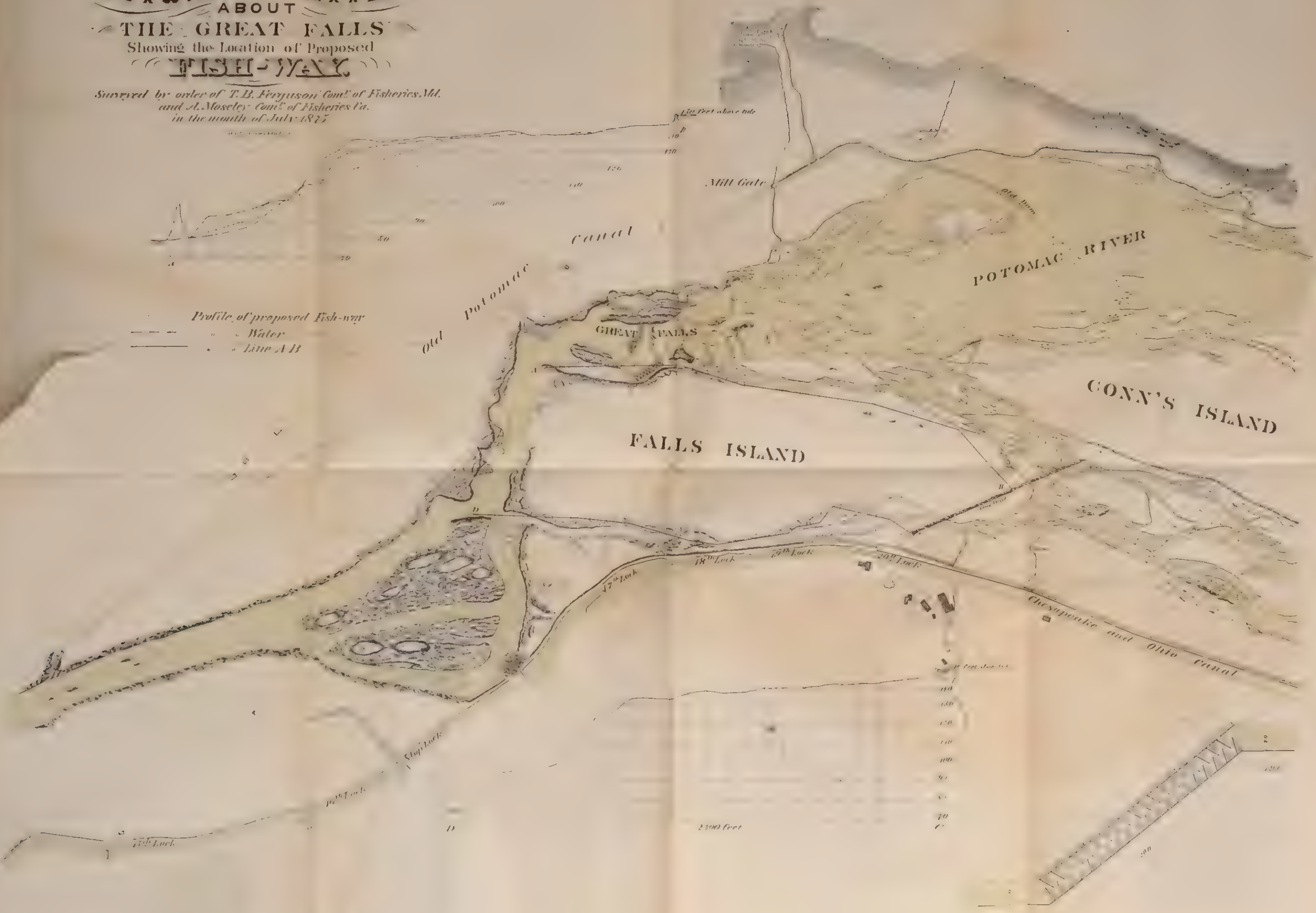
If you should adapt Jas. D. Brewer's patent fish-way to the main channel, located as you have suggested, on the west side of the Falls Island and alongside of the falls, it will be necessary to excavate about fifteen thousand five hundred cubic yards of rock, in order to provide an incline plane upon which to build the zig-zag walls and for the channels for ingress and egress with the proper rate of inclination. Putting this at one dollar per yard, will amount to fifteen thousand and five hundred dollars. This price may not be sufficient, from the fact, that it will be difficult to make these excavations without being interferred with by the water.

From the sketch of the fish-way which you have shown me I estimate that it will require about two hundred and twenty-five cubic yards of cut-stone, some of which would have to be fastened down with iron pins or bolts. This would cost about ten dollars per yard, amounting to two thousand two hundred and fifty dollars, and make up a total cost of seventeen thousand seven hundred and fifty dollars.

I hope what I have written, although containing no sug-

MAP OF THE POTOMAC RIVER ABOUT THE GREAT FALLS
Showing the Location of Proposed
FISH-WAY.

Surveyed by order of T. B. Ferguson Comr. of Fisheries Md. and A. Moseley Comr. of Fisheries Va. in the month of July 1877



gestion of value to the subject which you have in hand, will prove to be a correct description of the locality and of the difficulties to be overcome in enabling the migratory fishes to ascend the Potomac beyond the Great Falls.

Yours, &c., Rd. Randolph.

The accompanying map will show the profiles of lines run, and localities referred to in Major Randolph's report, as well as the localiton and plan of a fish-way proposed by Commissioner T. B. Ferguson, which provides for the construction of a channel, by blasting the rocks, with a grade of about three feet to the hundred, and then by means of devices for breaking the current, ascend in some two hundred feet about sixteen feet, and then by following the low places in the rocks, ascend some twenty-eight feet in eight hundred. This would necessitate the erection of a wall at a point where the water makes into the rock on the Maryland side opposite to the main falls. We have traced in the plan, simply as an illustration, a fish-way patented by Jas. D. Brewer, as it is one of the latest models, but do not intend in any manner to be understood as recommending its adoption, as we prefer to be governed, in deciding on a plan. by the results of the experiments which will be tested in the coming Spring before anything can be done towards the erection of a fish-way at this point. We would suggest, that, as four States and the District of Columbia are interested in the results to be obtained, and as the work will have to be done on land owned by the United States Government, and as the success of any plan is very dependent on the erection and management of the Government Water Works at this point, that some action be taken by your Excellency, or the General Assembly, to secure at least co-operation on the part of the General Government.

We find that it is entirely feasible to construct fish-ways over the dams throughout the State, and recommend that some statutory provision be made to ensure the enjoyment of the ancient and common law right which the people living on our rivers have to the free passage of the fish to their spawning beds. They have been entirely cut off from the Gunpowder by the several dams on that stream. We are in-

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The undersigned, a Commissioner of Fisheries of the State

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formed by Mr. Henry Carroll, that before the dams were erected, that the shad and rock ascended in numbers as far up as his estate, and were taken by the people on horseback by spearing them. Since they have been cut off from access to their spawning beds in the upper river, they have greatly diminished and almost disappeared from the lower river.

HATCHING HOUSE.

Section 3 of Act establishing the Commission of Fisheries, authorizes the Commissioners to "obtain the necessary ova, and construct and erect suitable houses and devices for hatching the same, and protecting the small fish, until fit to be distributed." But after a careful investigation into the cost of the site, and the erection of a hatching house, we found that we would not have the means to procure eggs, hatch them, and distribute the young fish—if we made the necessary outlay for a hatching house. We, therefore, arranged with Mr. Alexander Kent, to have the eggs which we might receive from the U. S. Commissioner, hatched in his establishment at Green Spring. Accordingly we placed in his charge the three hundred and seventy-five thousand eggs of the California Salmon received in October, 1874, and the eighty thousand of the Maine Salmon received March 9th, of the same year.

We found that if we had to pay the usual charge of one dollar and fifty cents ($2.50) per thousand for hatching Salmon eggs, we would not be able to operate as largely as desirable, even though we received the eggs free of all save express charges, from the United States Commissioner.

As we deemed it of the greatest importance that we should for some years to come introduce the California Salmon in as large numbers as possible, we made application to the United States Commissioner for a million of eggs from his establishment on the McCloud River, when he should distribute them in the Fall of 1875. To provide for their reception and care, we carefully examined the springs and their surroundings in Druid Hill Park, and after consultation with the Park Commissioners, addressed the communication which follows—

To the Honorable Mayor and Council,
of the City of Baltimore.

The undersigned, a Commissioner of Fisheries of the State of Maryland, being desirous to see established, in the vicinity of Baltimore, a hatching house, and ponds for the artificial propagation of fish, has consulted the Public Park Commissioners with the view of obtaining for the purpose the facilities which the Druid Hill Park affords, with its numerous springs, well adapted localities, etc., and believes that did the means at the disposal of the Commissioners admit, they would gladly see within the Park limits, an establishment not merely valuable for increasing the fish food resources of the State at large, but which would be an object of peculiar interest to all visitors to the Park. The arrangements of this establishment might be such as to contribute materially to the beauty of the Park, but without the means for any other than the most necessary expenditures to keep the Park in order, the Park Commissioners are unable to devote any portion of them to the purpose suggested. It is understood, however, that they cordially agree to the application now made to your Honorable Body for any appropriation for the purpose specified, which can be accomplished for the sum of five thousand dollars, a contribution to the beauty and interest of the Park which, it is earnestly hoped, your Honorable Body will find no difficulty in granting.

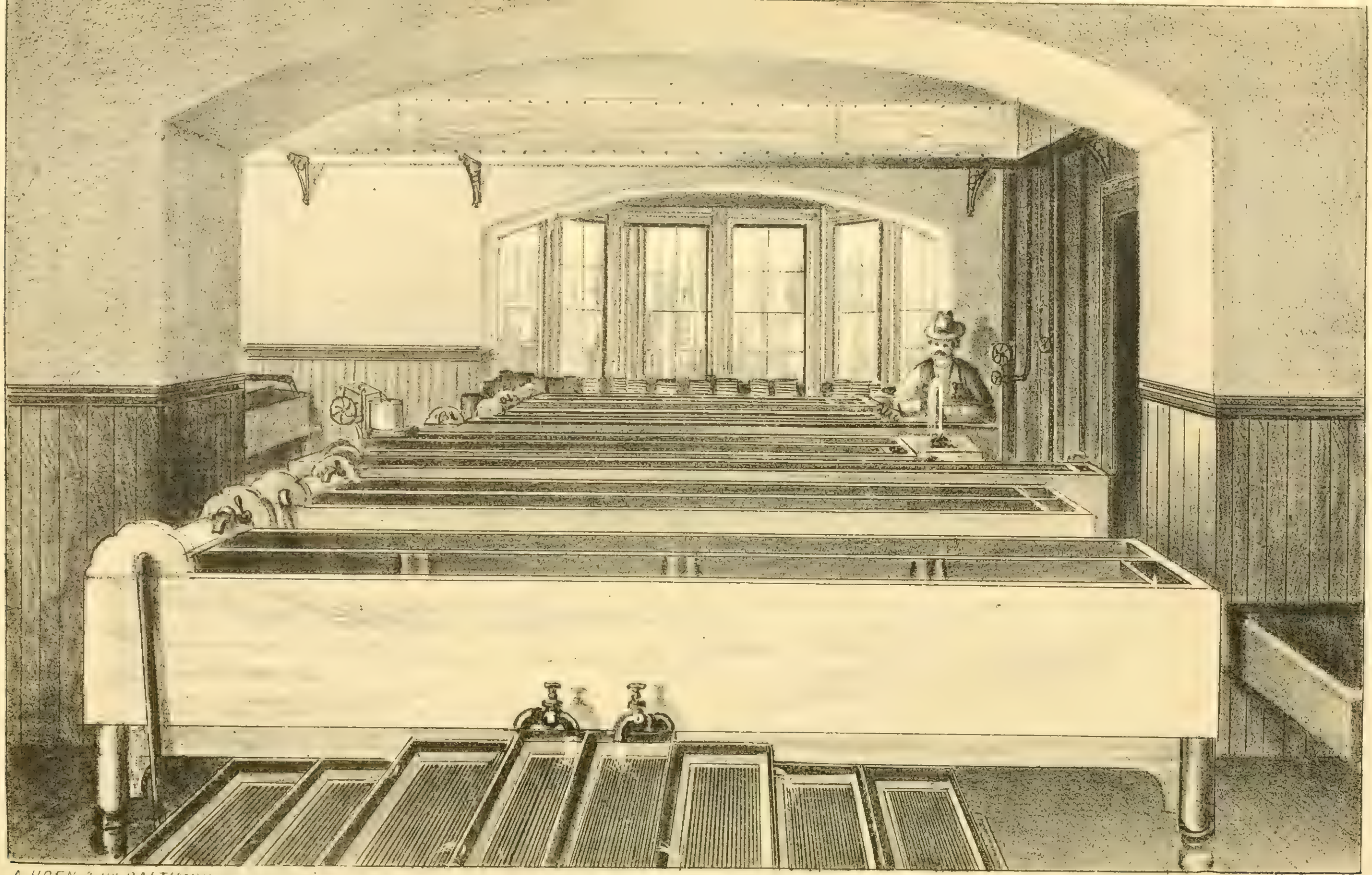
T. B. Ferguson, Commissioner.

In response to an invitation from Mr. John S. Bullock, Chairman of the "Committee of Ways and Means" to whom this letter was referred, Mr. Ferguson appeared before, and explained to the Committee the scope of the establishment such as contemplated, though comparatively small, such are the improvements in the apparatus used in fish culture, that millions of eggs could be hatched during the winter, and distributed throguhout the State.

Should the Water Board decide on the introduction of those fishes which would be likely to keep the water in the lakes and reservoirs pure, that by means of the hatching house, the supply could be so kept up that the lakes might be thrown open to anglers under proper restriction.

Having a breeding establishment in so central and accessible a locality, the citizens of Baltimore, as well as those from all parts of the State, would be educated to the importance, and thoroughly understand the subject of fish culture around which there has been some mystery thrown.

That the student of natural history might have an excellent opportunity of studying the habits, and observing the gradual development of the several kinds of fish ab ovo.



A HOEN & Co BALTIMORE.

INTERIOR OF DRUID HILL HATCHING HOUSE.

That it was contemplated to use the most approved kinds of apparatus, and to construct the ponds in the most perfect manner, so that those wishing to add fish culture to the other recreations and industries of their farms and country seats, would have before them a model in the establishment in the Park. Such is the topography of the country surrounding Baltimore, that almost every farm or villa has its spring or springs. Although there are few localities which offer facilities for fish culture as a business, yet almost every good spring can be made to support a thousand or so fish, which if consumed by the farmer, saves him just so much meat, and if sent to market adds just so much to the food supply from the country.

That the operations could be so conducted that visitors could see the various stages of the development of the eggs and the subsequent growth of the fish, and that our schools would have an opportunity of having illustrated to their classes in natural history, the discoveries on this important branch. That it would be a very important step towards supplying a long felt need in this country, of opportunities for students to study the embryology of the oviparous inhabitants of the water. In the pond connected with the hatching house would be deposited from time to time the several varieties of fish which were being introduced into the waters of the State, so that at this central point, the public would have an opportunity to see and become familiar with them.

He stated to the committee that should they see fit to make the appropriation asked, and the house was erected, and ponds constructed, the Commission of Fisheries would gladly take charge of them, and relieve the City and Park Commission of all expense of operating them. After the correspondence which follows a favorable report was made by the Committee, and the resolution making the appropriation which is copied below, was passed.

FITST BRANCH CITY COUNCIL,
Baltimore, March 24th, 1875.

To the Board of Park Commission.

GENTLEMEN:

A proposition has been submitted to the Mayor and City Council of Baltimore, by Major T. B. Ferguson, one of the Commissioners of Fisheries of the State of Maryland, in relation to the establishment of a Fish Hatchery in Druid Hill Park, and asking an appropriation of $5,000 to defray the expenses of constructing a house and appurtenances necessary for the same. The subject is now pending before the Committee of Ways and Means, who have instructed me to lay the matter before your Hon. Board, and ask an expression of your views in relation thereto.

With great respect, ALLEN E. FORESTER,
Committee Clerk.

OFFICE OF THE COMMISSION OF PUBLIC PARKS,
Baltimore, April 3rd, 1875.

The following proceedings were adopted in relation to the above:

A communication was received from the Clerk of the Committee of the Ways and Means of the First Branch of the Councils, submitting a proposition from the Fish Commission, looking to the construction of the necessary buildings and ponds for the hatching and production of fish in Druid Hill Park, which meets the approbation of the Park Commission, not in connection with the raising of fish with which they have no peculiar concern, but with a view of ornamentation in the Park, and increasing its attractions to the Public, when on motion it was *Resolved*, that the Commission will assent to the request of the Fish Commission, provided, that the place and location of all buildings and other construction in the Park, be first submitted to, and approved by the Commission.

(283)

A Resolution in relation to the establishment of a fish hatching house and ponds in Druid Hill Park.

Rosolved, by the Mayor and City Council of Baltimore, that the Park Commissioners be, and they are hereby requested to erect a hatching house, and construct ponds for breeding, rearing and exhibiting fish in Druid Hill Park, and that the sum of five thousand dollars, or so much thereof as may be necessary, be appropriated for the purpose, the same to be provided for in the levy of 1875.

SIGNED:—OTIS KEILHOLTZ, Prest. First Branch.
HENRY SEIM, Pres'd't. Second Branch.

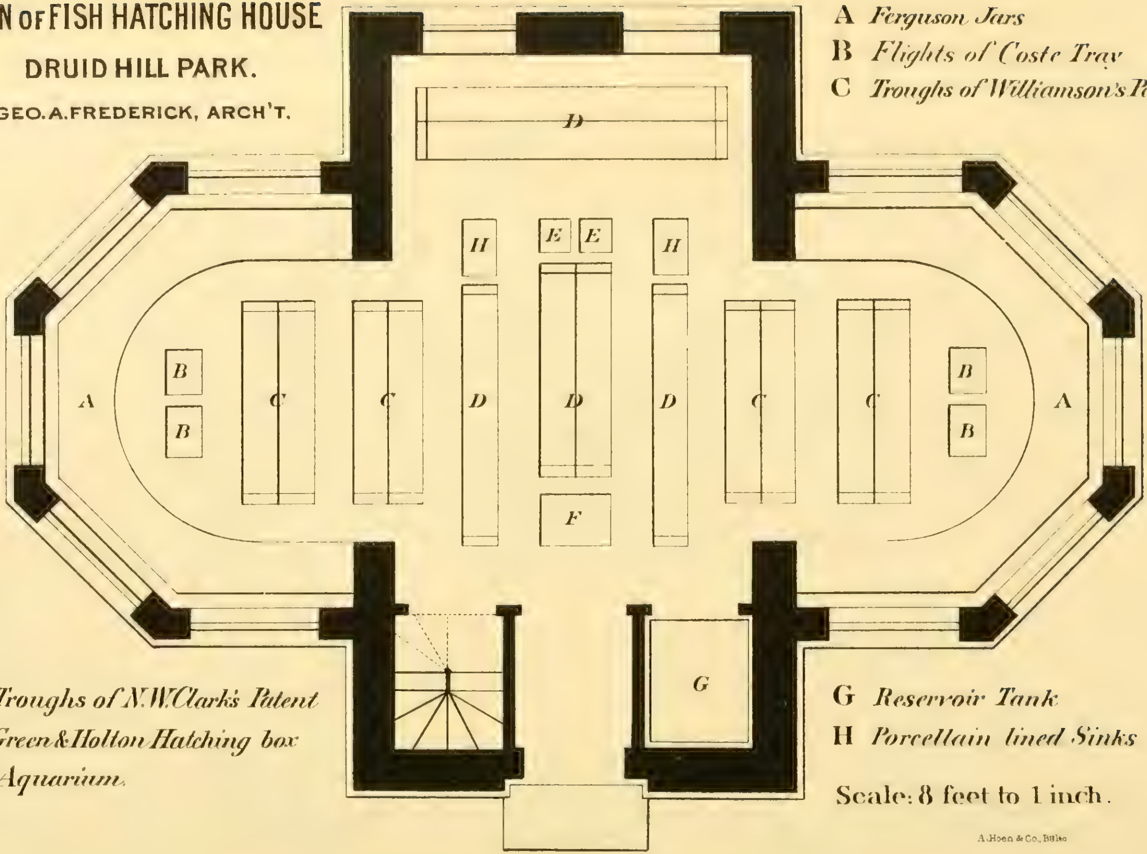
Approved May 11th, 1875.
JOSHUA VANSANT, Mayor.

The Park Commissioners had kindly instructed their Architect Mr. Geo. A. Frederick, to make a design for a building which would meet the requirements of the Fish Commission for fish culture: the estimate of $5,000 was based

PLAN OF FISH HATCHING HOUSE

DRUID HILL PARK.

GEO. A. FREDERICK, ARCH'T.



A *Ferguson Jars*
B *Flights of Coste Tray*
C *Troughs of Williamson's Patent*

D *Troughs of N. W. Clark's Patent*
E *Green & Holton Hatching box*
F *Aquarium.*

G *Reservoir Tank*
H *Porcellain lined Sinks*

Scale: 8 feet to 1 inch.

A. Hoen & Co., Balto

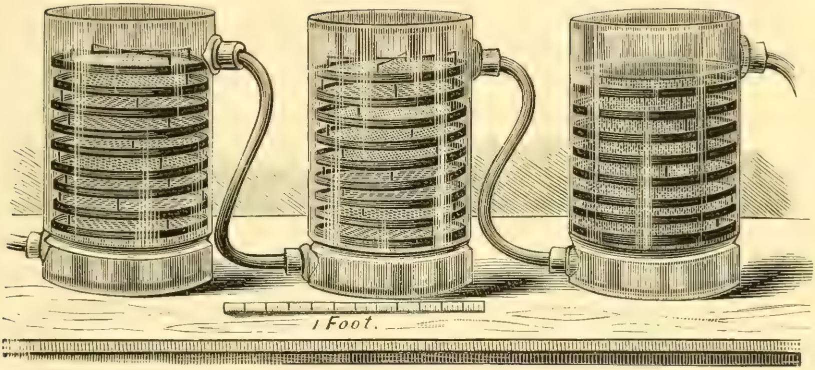
on the original design, which contemplated a wooden building, but the Park Commissioners decided that a stone structure would be more in unison with the surroundings of the locality selected, and with the heavy stone bridge near by, they therefore caused to be erected the beautiful stone building which adds so much to the beauty and attractions of the locality about Garrett's Bridge, although it necessitated a considerable additional expenditure which they generously provided for out of their fund for Park improvements. In accordance with the understanding with the Park Commissioners that we should have the use of the ponds and hatching house free of charge, we have placed the imported Carp in the ponds, and have hatched over six hundred thousand California Salmon in the hatching house, and have now, January 1st, 1876, forty-five thousand Salmon-Trout eggs in the hatching jars. The details of the construction of the ponds and surroundings, have been admirably designed and carried out by Mr. August Faul, the Park Engineer, and the ponds are models of completeness.

The great success of the hatching house, its capacity for hatching large numbers of eggs, the completeness of its arrangement, the ease and comfort with which the routine duties can be performed by the attendants, merits for it some description of the interior.

The building is of blue stone with white granite trimmings; the centre 18½ x 33 ft., is two stories high, and on either side are octagonal wings 14½ x 20 ft., whose sides are almost entirely of glass. The greatest amount of light and air is admitted through these, and two large windows in the gable end of the main buildings, the inner door of the vestibules is also of glass. The windows are all furnished with dark green water-proof curtains, to exclude the sun and light when desirable. The water is supplied from a strong spring on the side of the hill near by, and is piped into the filtering tank which is just below the ceiling of the hatching room, which occupies the first floor of the building. The supply pipe is so arranged with valves that the water can be conducted into the ponds below the house without entering the filtering tank should it be desirable. The water after passing through a series of flannel filters is discharged from the filtering tank into the reservoir tank "G," of the capacity of about twelve hundred gallons. From this tank the water is piped under the floor, which is a Schillenger pavement, to the several hatching troughs, and to the tables "A," in the octagonal extensions. These pipes are admirably arranged with stop-cocks, so that any portion of the apparatus can be operated without regard to the rest of the building.

In addition to the supply from the spring there are pipes by means of which an unlimited amount of water can be thrown into the filtering tank or ponds from the high service reservoir which is on the hill to the west of the hatching house. The water from the reservoir being influenced by the temperature of the atmosphere, and that from the spring being invariable, by mixing in different proportions, we can either raise or diminish the temperature of the water used, at will. The pipes which conduct the water to tables "A," on which the Ferguson Jars are operated, are furnished with $\frac{3}{8}$ of-an-inch spickets, over which rubber tubes are slipped, for the purpose of introducing water into the jars. These jars are of glass of the form shown in the annexed cut, which was made from a photograph taken when there were in the jar, on the right, between six and seven thousand eggs of the Salmon Trout. In the jars will be seen the wire trays on which the eggs are placed, the handle of each tray supports the tray next above.

When the young fish are free from the egg, they drop into the bottom of the jar, and can be easily transferred to the nursery tanks by placing the jar into the tank; and by removing the cork through which the rubber pipe passes, the fish can swim out, or if too inactive, a current can be created by lifting the jar. Several jars can be connected as in the cut, or operated singly if water is abundant. Each jar is provided with a tin cover, a larger cylinder than the jar, which excludes the light, and the tables are furnished with seventy jars each, making the total capacity of the two tables, nearly one and a-half millions of brook Trout eggs. Through the whole extent of the appartment are troughs arranged in pairs, which are provided with movable partitions, and can be used as hatching or rearing troughs; immediately below each pair is another pair which can also be similarly used.



Ferguson Hatching Jars.

The accompanying cut shows the manner in which the water is introduced and taken away. They are admirably arranged to secure a perfect circulation and change of water which is constantly flowing through them. The water having passed through the upper troughs furnishes the lower pair, dropping down through a space of about 18 or 20 inches, it is completely broken and aerated.

Those marked "C" are arranged so as to cause the water to enter at the bottom of the trays in each division; flowing up through them, and over the top of the partition, is conducted into the next division from below. This is the form of hatching box designed by John Williamson, Secretary of the California Acclimatizing Society. The troughs marked "D" are so arranged that the water takes just the opposite course, entering at the top of the trays, it flows down through them. This device is patented by N. W. Clark, of Michigan, who has kindly permitted their use by us, without charge. At "B" there are two flights of Coste trays, after the model of those used at Huningen and elsewhere in Europe. "E" are hatching boxes, as patented by Green & Holton, and so successfully used in the hatching house of the New York Commission. The right to use them was kindly accorded us by Seth Green, Esq., the assignee.

In aquarium "F" which is supplied with running water, we intend exhibiting rare fishes, from time to time. The porcelain lined sinks "H," furnished with the same water which is used in the troughs, are of great convenience. All the water, save that from the sinks, after being used in the hatching house, is conducted into the ponds below the building. The coste trays and the troughs next to them can be removed at any time without interferring with the flow of water, and can be replaced by stoves or aquaria as desired. It is scarcely probable that it will be found necessary to use stoves as the spring water entering the building at a temperature of 53° Fahrenheit, and being exposed in the closely built stone building, the temperature is kept much above freezing. The two rooms above, in the second story, are occupied respectively as office and sleeping apartment for keeper. The moisture is cut off from the second story, by a layer of slate in the walls.

We are indebted to the City of Baltimore and the Park Commissioners for this most complete, comfortable, and perfect establishment, in which many millions of fish can be hatched and distributed each winter, at no great expense, if we are provided with means to procure the eggs.

CONCLUSION.

By reference to tables recording hatching operations and distribution of Shad, Salmon, &c., it will be seen, that we have hatched and turned loose into our waters four million three hundred and forty thousand young Shad, in addition to the four million nine hundred and seventy-five thousand five hundred and fifty hatched and liberated in the Potomac, under the auspices of Prof. Spencer F. Baird, at a cost to the United States of over three thousand dollars ($3,000), that we successfully planted one hundred and forty-four thousand healthy, vigorous, California Salmon, eighty thousand Maine Salmon, two thousand Salmon Trout, and transferred five hundred Black Bass, most of them adults, from the Potomac River to other waters of the State. We have in addition put out, within the past two weeks, ninety-one thousand five hundred California Salmon, and have in the Druid Hill Hatching House over four hundred thousand of two months old fish still for distribution, besides about three thousand of a year old. There are in the hatching jars, forty-five thousand eggs of the Salmon Trout, which are hatching every day.

We find the same decrease in our valuable food fishes, which has been felt in other parts of the country, and which has been arrested in some States by artificial propagation. and by judicious protection.

That the decrease is attributable to:

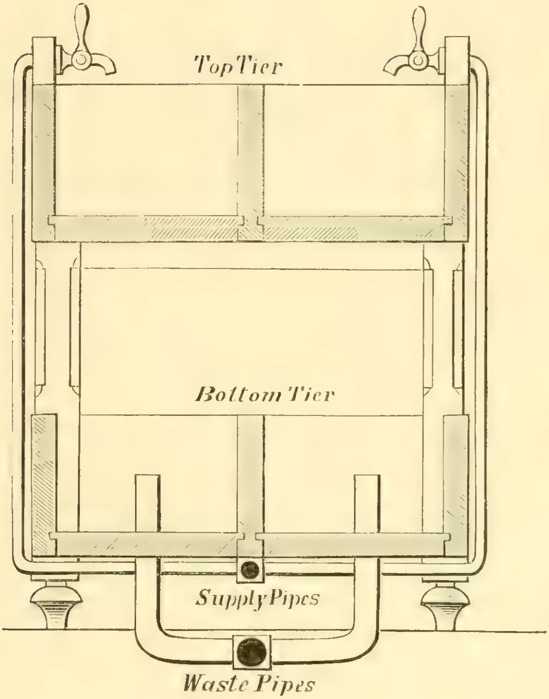
1st. Excessive fishing.

2nd. The cutting off of the migratory fishes from their spawning beds.

3rd. The disturbing of the breeding fish on their spawning beds.

4th. The destruction of spawn, by washings from cultivated fields, and natural enemies.

5th. The destruction of young fish, by improper means and modes of capture.



Section of Hatching Trough, $\frac{3}{4}$ Scale.

The remedies are:

1st. Artificial propagation to supply the excesive drain caused by increased population, and improved means of capture.

2nd. By prohibiting all fishing with nets, seines or fixed apparatus for thirty-six hours in each week, during the migrations of anadromus fishes, so as to give a sufficient number of breeding fish an opportunity of reaching their spawning grounds, (this is universally believed to be the most important step towards the preservation of our best food fishes.)

3rd. By protecting the fish on their spawning beds; that is, by prohibiting their capture as their spawning seasons approach (the habits of each species must determine the period during which it should be protected.)

4th. By the apparatus of fish culture to protect the eggs and young fish from the causes of loss.

5th. By regulating the size of the meshes of nets and seines, and by probibiting the erection or use of "fish-traps" or "fish-baskets," (we cannot too strongly urge the entire abolition of "fish-traps.")

We would recommend that a small tax be levied on seines, nets and fixed apparatus used to capture fish, and that the tax be in proportion to their capacity of destroying fish.—Those from whom this tax will be collected, will be the most immediately effected by the results of artificial propagation, and should be ready to furnish some of the means to carry on the hatching operations.

We would recommend, in order to induce the construction of "ponds," such as here-in-before described, that all seines landed in such "ponds," be exempt from taxation for a certain period.

We would also recommend, in order to better regulate the fishing, that all nets, seines and fixed apparatuses, be licensed, and that "Fish Wardens" be provided, whose duties will be to see the laws enforced in the river districts, and that provisions be made to ensure the observance of the laws in the bay and navigable rivers.

Several instances have been reported to us, of parties coming into our waters from other States, hauling large seines and taking off large quantities of fish, in some instances landing their seines on shores without permission of the proprietors, and in defiance of them. Such depredations and lawlessness should be stopped.

We believe that with proper equipments, and an annual appropriation of ten thousand dollars, the best food fishes can be propagated in sufficient numbers, to meet the increasing diminution, and restore our abandoned fisheries.

We beg leave here to express our grateful acknowledgments to all those, who have from time to time aided us in stocking our rivers, and in other work connected with the Commission, without whose aid we could not have accomplished so much with the means at our disposal. In addition to those whom we have already mentioned, we beg to express our especial thanks to Vice-Presidents John King and Wm. Keyser, of the Baltimore and Ohio Railroad for free transportation. To Thos. R. Sharp, Master of Transportation and Mr. Oliver Hoblitzel, of the same road, for many acts of courtesy, by which we were enabled to move live fish with rapidity on their fast trains. To President J. H. Hood, of the Western Maryland Railroad, and Mr. Geo. C. Wilkins, Superintendent of the Northern Central Railroad, for free transportation, and for general orders, which insured the assistance of their agents. We are also indebted to Mr. Samuel M. Shoemaker, the Resident Manager of Adams' Express Company, for an order instructing all agents of his Company transport freight of the Commission at half price. To Ex-Vice-President, DuBarry, for free transportation during his administration, on the Baltimore and Potomac Railroad. And to Mr. Augustus Albert, President of the Chester River Steamboat Company, for full use of their line of Steamers.

Respectfully submitted,
T. B. Ferguson,
Philip W. Downes,
January 1st, 1876. Commissioners of Fisheries.

RECORD

Of Shad Hatching operations conducted at Bristol, Maryland, on the Patuxent River, from April 27th, 1875, to May 30th, 1875, on account of the State of Maryland, by Oren M. Chase.

Line No.	Date.	Tempt'e				Wind. Direct'n	Fish Taken.	Ripe Fish.	Eeggs Obtained.	Fish Turned Loose.	REMARKS.
		Air.		Surface Water.							
		7 a. m.	6 p. m.	7 a. m.	6 p. m						
...	Ap. 27	56	60	48	52	N. West	200	1	20,000	....	Water very muddy.
...	28	56	60	48	50	North.	110	...	....	....	Freshet.
...	29	58	60	49	52	South.	60	...	....	....	Blowing a gale.
...	30	60	62	52	56	North.	90	..	....	....	....
...	May 1	58	58	54	54	N. East.	....	..	....	....	....
...	2	56	52	50	48	N. West	....	...	....	....	Blowing very hard.
...	3	48	46	48	64	N. West	....	...	....	....	....
...	4	48	46	52	56	North.	....	...	....	....	High Wind.
...	5	50	56	52	58	S. West.	....	...	....	....	....
...	6	56	56	54	60	West.	....	...	....	....	....
...	7	50	62	52	59	East.	160	2	60,000	....	....
...	8	52	60	58	60	S. East.	280	...	....	....	....
...	9	58	78	59	65	North.	....	...	....	....	....
...	10	74	60	65	65	N. West	....	31	465,000	....	Heavy gale.
...	11	60	74	63	68	S. West	160	9	180,000	....	....
...	12	67	70	63	68	South.	260	13	215,000	....	Blowing hard.
...	13	50	58	64	63	S. East.	127	10	225,000	....	....
...	14	60	71	64	68	S. East.	118	19	365,000	40,000	....
...	15	75	70	66	65	N. West	110	10	170,000	....	....
...	16	54	63	63	65	North.	....	...	....	....	....
...	17	62	65	63	65	N. West	162	9	240,000	320,000	....
...	18	51	58	62	64	West.	90	7	160,000	140,000	....
...	19	52	60	60	63	North.	....	...	....	160.000	Heavy wind and raining
...	20	64	76	61	64	Chang'g	241	12	280,000	175,000	....
...	21	71	80	63	68	South.	90	...	....	250,000	....
...	22	73	80	68	71	S. West	....	...	....	140.000	....
...	23	80	83	71	75	South.	....	...	....	190,000	....
...	24	70	71	75	74	South.	72	10	230,000	140,000	Blowing and raining.
...	25	68	82	74	78	East.	86	19	380,000	....	Raining hard.
...	26	73	80	75	78	N. West	....	...	....	240,000	Fishing stopped to day.
...	27	78	78	76	78	N. East.	....	...	....	....	....
...	28	76	79	74	79	South.	....	...	....	....	....
...	29	70	78	74	78	S. West	....	...	....	210,000	....
...	30	66	78	72	77	North.	....	...	....	350,000	....
						Total............................				2,355,000	All turned loose in Patuxent River.

RECORD

Of Shad Hatching operations canducted at Coppage's Landing on the Chester River, Md., from May 6*th*, 1875, *to June* 14*th*, 1875, *on account of the State of Maryland, by Alex. Kent.*

Line No.	Date.	Temperature.				Wind Direc.	Fish taken	Ripe Fish.	Eggs Obtain-ed.	Fish Turned Loose.	REMARKS.
		Air.		Surface Water.							
				2 to 3p.m.							
...	May 6	...	...	60	......	....	150	5	3,000	....	Fish only partially ripe.
...	7	...	...	64	......	....	300	4	20,000	....	" " " "
...	8	...	...	62	......	....	150	1	4,000	....	" " " "
...	9	...	...	64	......	....	700	...	....	....	....
...	10	...	...	65	......	....	310	1	20,000	....	....
...	11	...	...	66	......	....	165	...	....	....	....
...	12	...	...	67	......	....	....	...	....	....	....
...	13	...	...	67	......	....	39	...	....	....	....
...	14	...	...	67	......	....	27	...	....	....	....
...	15	...	...	63	......	....	106	2	10,000	....	Fish only partially ripe.
...	16	...	...	63	......	....	97	...	....	....	....
...	17	...	...	65	......	....	....	...	....	....	....
...	18	...	...	66	......	....	....	...	....	25,000	....
...	19	...	...	67	......	....	189	5	60,000	5,000	Fish only partially ripe.
...	20	...	...	71	......	....	144	3	20,000	5 000	" " " "
				7am	3pm						
...	21	...	...	72	80	....	225	5	100,000	....	" " " "
...	22	...	...	75	82	....	160	4	100,000	....	" " " "
...	23	...	...	76	83	....	265	...	....	....	....
...	24	...	...	76	83	....	158	4	80,000	150,000	....
...	25	...	...	76	78	....	126	6	150,000	....	....
...	26	...	...	75	77	....	117	18	250,000	60,000	....
...	27	...	...	78	80	....	87	10	200,000	70,000	....
...	28	...	...	75	78	....	36	8	100,000	140,000	Fish only partially ripe.
...	29	...	...	76	79	....	46	10	all died	125,000	....
...	30	...	...	74	73	....	137	10	250,000	150,000	....
...	31	...	...	73	73	....	83	...	125,000	60,000	....
...	June 1	...	...	72	74	....	23	12	225,000	125,000	....
...	2	...	...	72	73	....	63	5	40,000	75,000	....
...	3	...	...	70	71	....	14	...	....	....	....
...	4	...	...	70	72	....	47	18	250,000	150,000	....
...	5	...	...	74	77	....	....	...	....	....	40,000 sent to Choptank
...	6	...	...	76	79	....	....	...	....	....	....
...	7	...	...	77	80	....	36	3	150,000	....	....
...	8	...	...	76	78	....	60	10	225,000	125,000	60,000 sent to Elkton.
...	9	...	...	72	76	....	....	9	200,000	....	....
...	10	...	...	73	78	....	....	8	150,000	....	....
...	11	...	...	76	79	....	....	6	No milt	75,000	30,000 to Gunpouder.
...	12	..	...	77	80	....	....	...	....	200,000	....
...	13	...	...	73	74	....	....	...	....	180,000	60,000 to Potomac.
...	14	...	...	73	74	....	....	...	....	75,000	....
									Totals.	1,795,000	190,000 aggr'g 1,985,000

A.

RECORD of Shad Hatching Operations conducted at Freestone, Va., on the Potomac River, from May 15*th*, 1875, *to May* 25*th*, 1875, *on account of U. S. Commission, by Jonathan Mason.*

Line No.	Date.	Temperature.						Wind Direct'n.	Fish Taken.	Ripe fish Females.	Eggs Obtained	Fish Turned loose in River.	REMARKS.
		Air.			Surface Water.								
		6A.M.	M.	6P.M.	6A.M.	M.	6P.M.						
1	May 15	58	80	63	56	60	64	V.	445	10	175,000	....	From 4 fish taken, many eggs all dead.
2	16	50	60	58	55	59	63	N.	170	3	75,000	....	....
3	17	52	60	57	56	61	64	N. W.	371	16	408,000	....	....
4	18	52	63	55	58	62	64	S.	311	12	257,000	....	....
5	19	48	72	68	58	64	64	S. W.	329	12	390,000	....	....
6	20	52	80	81	59	65	68	S.	304	1	25,000	....	....
7	21	56	78	65	62	72	76	S. E.	173	6	125,000	103,500	4 ripe fish not recorded, eggs all dead.
8	22	62	78	68	68	72	75	S.	.....	.....	....	215,000	Seine stopped.
9	23	63	84	82	69	79	78	S. E.	.....	.....	....	472,000	....
10	24	70	80	69	72	78	75	S. E.	.....	.....	....	266,250	....
11	25	66	81	...	71	75	...	S. E.	.....	.....	....	100,000	Total, 1,156,750

A.

RECORD of Shad Hatching Operations conducted at Moxley's Point, on the Potomac River, from May 26*th*, 1875, *to June* 7*th*, 1875, *on account of U. S. Commission, by Jonathan Mason.*

Line No.	Date.	Temperature. Air. 6 A.M.	Temperature. Air. M	Temperature. Air. 6 P.M.	Temperature. Surface Water. 6 A.M.	Temperature. Surface Water. M.	Temperature. Surface Water. 6 P.M.	Wind Direct'n.	Fish Taken.	Ripe fish Females.	Eggs Obtained	Fish Turned Loose.	REMARKS.
1	May 26	66	82	80	71	75	72	N.	87	8	200,000	....	From one fish, all eggs dead, eggs looking bad when taken.
2	27	70	78	72	72	77	79	E.	112	2	50,000	....	1 fish, eggs all dead, 5 fish with poor eggs.
3	28	67	80	71	69	78	77	E.	270	24	565,000	....	
4	29	73	84	75	70	78	78	S. to N.	126	12	290,000	....	First fish hatched.
5	30	62	74	74	70	78	74	N.	134	13	275,000	160,000	
6	31	67	80	76	70	79	78	V.	113	6	125,000	25,000	One net cut out.
7	June 1	70	81	75	72	80	81	S. E.	130	6	120,000	50,000	Wind very high, causing loss of eggs.
8	2	71	71	71	73	71	74	S.	103	6	130,000	232,500	
9	3	63	71	71	70	71	72	S. E.	......	......	....	220,000	
10	4	63	78	73	70	81	79	V.	......	......	....	210,000	Shipped 30,000 to Washington and turned into Potomac at that point.
11	5	69	82	74	71	80	80	S.	......	......	....	105,000	
12	6	71	80	82	73	82	84	W.	......	......	....	70,000	
13	7	72	...	...	74	...	...	S.	......	......	....	110,000	Total turned into River 1,182,500.

A.

RECORD of Shad Hatching operations conducted at Jackson City, on the Potomac River, from May 18*th*, 1875, *to June* 4*th*, 1875, *on account of U. S. Commission, by H. W. Welsher.*

Line No.	Date.	Tempt'e Air. 6 a. m.	Tempt'e Air. 6 p. m.	Tempt'e Surface Water. 6 a. m.	Tempt'e Surface Water. 6 p. m.	Wind. Direct'n	Fish Taken.	Ripe Fish Males.	Ripe Fish Fem'ls.	Eggs. Obtained.	Eggs Lost.	REMARKS.
1	May	...	...	60	61	W.	80				....	....
2		...	...	61	62	W.	58				....	....
3	20	...	...	63	64	N. W.	40	2	1	12,000	....	....
4	21	67	66	67	66	S.E. & S	36	1	1	15,000	....	....
5	22	72	72	66	70	W.	11	1	3	60,000	....	....
6	23	76	80	77	76	....	30	1	1	15,000	....	....
7	24	67	71	70	73	S. E.	25	2	4	70,000	....	....
8	25	68	74	71	75	E.	28	1	2	40,000	....	....
9	26	68	79	72	76	N. E.	6	0	0	6,000	....	....
10	27	72	66	78	75	E.	20	2	3	70,000	....	Part washed out by gale.
11	28	68	64	72	74	S.	25	3	7	150,000	....	Fish partly developed.
12	29	60	72	72	76	N. W.	24	4	9	160,000	....	....
13	30	63	74	66	76	N.	52	1	4	50,000	....	....
14	31	59	71	69	76	N.	46	2	6	150,000	....	....
15	June 1	67	70	72	75	S. S. E.	33	2	4	100,000	....	....
16		62	64	70	72	S.	22	2	3	75,000	....	Fishing Stopped.
17	3	62	68	69	70	S. E.	50	4	6	125,000	119,209	Fish turned into river,
18	4	68	78	71	78	E.	37	3	5	100,000	....	1,072,800.

NOTE.—Total number turned into Potomac, 4, 975, 550.

A.

RECORD of Shad Hatching operations conducted at Ferry Landing, on the Potomac River, from May 21st, 1875, to May 29th, 1875, on account of U. S. Commission, by H. W. Welsher.

Line No.	Date.	Temperature.			Wind. Direct'n.	Fish Taken.	Ripe Fish		Eggs Obtained.	REMARKS.
		Air.	Surface Water.				Males.	Fem'ls		
			6 A.M.	6 P.M.						
1	May 1	......	68	69	S. W.	860	......	2	60,000	Seine hauled three times every twenty-four
2	2	......	70	70	S.	801	......	3	90,000	hours.
3	3	......	70	71	W.	569	......	5	130,000	....
4	4	......	72	72	S. W.	384	......	6	155,000	....
5	5	......	72	72	N. E.	383	......	10	260,000	....
6	6	......	72	73	S. E.	568	......	9	220,000	....
7	7	......	72	74	N. E.	695	......	8	200,000	1.263,500 turned loose at ferry.
8	8	......	75	76	S. E.	514	......	11	300,000	210.000 taken to Jackson City, and turned
9	9	......	76	8 ...	S.	......	......	2	55,000	loose at that point. Total 1,473,500.

LIST

Of Fisheries on the Potomac River.

No.	Name of Fishery.	By whom Owned	By whom Fished.	REMARKS.
		Maryland.		
1	White Point.			
2	Maryland Point.	Moore & Smith	Price Green.	
3	Budd's Ferry.		Cunningham.	
4	Stump Neck.		Cunningham.	
5	Rum Point.			
6	Chapman's Point.	Pearson Chapman.	J. S. Chapman.	
7	Pomonkey Point.		S. H. Barron.	
8	Gutt Landing.		W. M. Elliott.	
9	Greenway.	Mrs Brant.	Moore, Smith & Co.	
10	Bryan Point.		Conrad Faunce.	
11	Moxley Point.		Jerry Skidmore.	
12	Meddow Bars.			
13	Tent Landing.		Capt. Jas. Guy.	
14	Sandy Bar.			
15	Berry's Landing.			
		D. C.		
	Skidmore's Island.			
	Stick Landing.			
1	Caywoods.		Joseph Cogwood.	
2	Mathias Point.			
3	Windmill Point		Conrad Faunce.	
4	Tumps.			
5	Gum.		Jerry Dobbles.	
6	Arkendale.		Joseph Beasley.	
7	Clifton.		Withers, Waller & Co.	
8	Freestone Point.	J. W. Fairfax.	Jacob Faunce.	
9	Deep Hole.		McKewen & Ticer.	
10	Sandy Point.		Henderson & Kelly.	
11	Coale's Point.		Tucker & Hall.	
12	Barn Landing.		Jno. Heisler.	
13	Tick Landing.		A. J. Heisler.	
14	Ferry Landing.	Wm. Ruitz.		
15	Dangerfields.			
16	Jackson's City.		Gibson Heirs.	

RECORD

Of distribution of California Salmon made from November 25th, 1874, *to December* 15*th*, 1874, *by direction of Maryland Commissioners of Fisheries.*

No. of Line.	Date of Transfer.	Obtained from--	Place whence Taken.	NUMBER OF FISH. Originally Taken.	NUMBER OF FISH. Actually Planted.	INTRODUCTION OF FISH. Place.	INTRODUCTION OF FISH. Stream.	INTRODUCTION OF FISH. Tributary of--	Transfer in Charge of--	REMARKS.
1	Nov. 25	U. S. Com.	Green Spring. Trout Ponds.	6,000	6,000	Tank Station, W.M.R.R.	North Patapsco.	Patapsco.	T. B. Ferguson,	
2	“ “	“ “ “	“ “	1,500	1,500	Wakefield, W. M. R. R.	Pipe Creek.	Monocacy.	“ “ “	
3	“ “	“ “ “	“ “	1.000	1.000	Union Bridge.	“ “	“	“ “ “	
4	“ “	“ “ “	“ “	1,500	1,500	Slabtown.	Owens Creek.	“	“ “ “	
5	“ “	“ “ “	“ “	3,000	3,000	Hagerstown.	Antietam.	Potomac.	“ “ “	
6	“ 30	“ “ “	“ “	10,000	10,000	Parkton, Freeland, Middletown and Gores Meedow.	Gunpowder.	Gunpowder.	“ “ “	
7	Dec. 1	“ “ “	“ “	6,000	6,000	Eastern Shore	Rivers.		P. W. Downes,	
8	“ 2	“ “ “	“ “	10,000	10,000	Hagerstown.	Conococheague.	Potomac.	“ “ “	
9	“ “	“ “ “	“ “	6,000	6,000	Mechanicstown.	Owens Creek.	Monocacy.	Wm. Hamlen,	
10	“ “	“ “ “	“ “	5,000	5,000	Above Tameny.	Evitts Creek.	Potomac.	P. W. Downes.	
11	“ “	“ “ “	“ “	5,000	5,000	Near Jenning Run.	Wills Creek.	“	“ “ “	
12	“ 3	“ “ “	“ “	15,000	15,000	Frankville.	Savage.	“	T. B. Ferguson,	
13	“ 5	“ “ “	“ “	4,000	4,000	Monrovia.	Bush Creek.	Monocacy.	Benj. F. Sheriff,	
14	“ “	“ “ “	“ “	6,000	6,000	Hood's Mill.	Patapsco.	Patapsco.	Wm, Hamlen,	
15	“ “	“ “ “	“ “	10,000	10,000	Liberty Grove.	Octoraro Creek.	Susquehanna.	P. W. Downes,	
16	“ 9	“ “ “	“ “	8,000	8,000	In Howard County.	3 Branches of	Patuxent.	T. B. Ferguson,	
17	“ “	“ “ “	“ “	15,000	15,000	Romney, Va.	South Fork.	Potomac.	Benj. F Sheriff,	
18	“ “	“ “ “	“ “	15,000	15,000	Ft. Pendleton.	North Fork.	Potomac.	Alex. Kent,	
19	“ 15	“ “ “	“ “	10,000	10,000	Near Source of	Patuxent.	Patuxent.	Wm. Hamlen,	
20	“ “	“ “ “	“ “	6,000	6,000	Near Penn. Line.	Deer Creek.	Susquehanna.	Benj. F Sheriff.	Total distributed 144,000.

A JOURNAL

Kept by Alexander Kent, from April 27th, to June 14th, 1875, showing operations conducted at Coppage's Landing, Chester River, under directions of T. B. Ferguson, Commissioner of Fisheries, Maryland:

April 27th.—Left Baltimore on Steamer Chester, for Chester River; stormy weather prevented further progress than Chestertown.

April 28th.—Storm more violent, could not proceed.

April 29th.—Clear and pleasant, proceeded up river, verified information previously received by calling at shore continually:—John Primrose, owner of first fishery, rents to colored men for $150.00 per annum. Thomas Primrose, the second, lets to F. Nichols. John Harris, the third, fishes it himself. The fourth is owned and fished by Edward Slaughter, worth $125.00 per annum. The fifth by Samuel Chairs owned and fished, worth $175.00 per annum. The sixth owned and fished by Robert Bostwick, worth $250.00 per annum. The seventh is fished by G. H. Fennimore, owned in Delaware, worth $75.00 per annum. The eighth owned by Sheppard, fished by John Carson. The three next in order are Gray's fishery, owned by Mrs. Fry, one fished by Samuel Ashley, colored, and one by Chester Larman, also colored. The following three shores owned by Mr. Pickup, and fished by Rolph, then one owned by Mallalien, and fished by Rolph. The rents vary greatly, running as high as $400.00. We found Coppage's Landing, about three miles above Crumpton, a favorable locality for camp, water was fresh, and many shad caught, nearly ripe.

April 30th.—Catch light, no ripe fish.

May 1st.—Catch very light, no ripe fish.

May 3rd.—Cold and windy, caught two hundred shad, none ripe.

May 4th.—Catch lighter, got a thousand or more eggs from partially ripe fish.

May 5th.—Caught only fifty shad, none ripe. From Thursday to Wednesday, temperature of water ranged from 52° to 57°.

May 6th.—Examined one hundred and fifty shad, found five partially ripe; obtained only three or four thousand eggs: temperature of water at 2 o'clock P. M., 60°.

May 7th.—Examined three hundred shad, none fully ripe, from which few eggs were obtained: good many from one: took 20,000 eggs in all; temperature of water at 3 P. M., 64° on surface.

May 8th.—Examined twenty-five before day-light, none ripe; afternoon hauls yielded one hundred and fifty, none ripe; morning cool, day cloudy, temperature of water at noon 62°; sent for more hatching boxes; in the evening, took about four thousand spawn; from Saturday to Monday, seven hundred shad caught, all unripe, split and salted them: in some of them roe was beginning to separate, most of them compact, and in a few beginning to run near the vent.

May 10th.—Caught about two hundred and sixty-five in the morning: in the evening, one hundred: total number spawn, 20,000 from one ripe shad.

May 11th.—Caught one hundred and sixty-five, none ripe.

May 12th.—Caught thirty-four, none ripe.

May 13th.—Caught sixty-five, none ripe.

May 14th.—Caught twenty-seven, none ripe.

May 15th.—Caught one hundred and thirty-six, two partially ripe, obtained ten thousand eggs.

May 17th.—Caught ninety-seven, none ripe.

May 18th. Caught one hundred and nineteen, none ripe.

May 19th.—Caught one hundred and eighty-nine, two ripe; three partially ripe; took about sixty thousand eggs.

May 20th.—Caught one hundred and forty-four, three ripe: took sixty thousand eggs, two of the fish were stripped an hour after they were dead, and milt taken from dead males caught three hours before.

May 21st.—Morning catch one hundred and twenty-nine, large portion females, unripe; evening catch ninety-six, five ripe, 100,000 eggs; eggs taken on 20th from dead fish, and impregnated with milt from dead males, look very well; especially lot carried for twenty minutes in search of milt, they were more fully matured than others, and nearly all good.

May 22nd.—Morning catch ninety, none ripe; eggs looking well; fish quite active in those of 19th; morning tide unusually low at 2½ o'clock A. M.; found five boxes of eggs taken last evening entirely out of water; temperature of air and water about the same; eggs being moist were uninjured; evening, catch seventy of them four ripe females, 100,000 eggs.

May 23rd.—One seine hauled two hundred and sixty-five caught, none ripe: saw large number split Monday: roe firm generally.

May 24th.—Morning catch one hundred, none ripe; evening catch fifty- eight, four ripe, 80,000 eggs; eggs of Saturday doing well; up river seine caught none; alewives made their appearance at "the Rocks," from this fact, some fishermen predict immediate decline of shad.

May 25th.—Morning catch only twenty-five; evening catch one hundred and one, six ripe; yielded one hundred and fifty thousand eggs. Lot No. 9 taken Saturday, nearly all hatched, lost about twenty-five per cent. Lot No. 10. taken Monday, doing well.

May 26th.—Morning catch none: Lot No. 11 taken Tuesday, looking, except one box, very well; evening, catch one hundred and sixteen, took spawn from 18; many eggs had a dull look, even when ripe; in some fish all were dead: this we find generally the case when a fish bears marks of a gill-net; in some cases when no injury is perceptible, we find all the spawn dead. We think that whipping the river. thus terrifying the shad, injures the eggs; the eggs taken are estimated at 250,000, (Lot 12.)

May 27th.—Morning haul yielded only one; evening haul eighty-seven. Stripped ten females and took 200,000 eggs. In several fish, eggs dull color; many of which failed to impregnate, though treated with greatest care.

May 28th.—Caught thirty-six, mostly females, stripped eight, but more than half the eggs failed to imgregnate, obtained one from a gilier, just as he took it from the net: stripped it very carefully, and milted immediately, using very little water, stirring gently until the milt was thoroughly diffused through the mass. The milt flowed freely, and was taken from a fish not quite dead. The eggs were transparent but slightly pale. Not more than forty per cent. of these, however, showed impregnation. As this failure to impregnate has been experienced only since the hot weather, I am disposed to attribute it partly, at least, to the high temperature of the water in the shallow parts of the river through which the Shad are obliged to pass. We have recorded a temperature of 82°, and have no doubt that farther down the river, on the large flats it has been frequently higher.

May 29th.—Morning catch 22, some ripe males, no ripe females; preserved vial of milt for night catch; at night caught 24; stripped ten females, found only dead spawn, every egg failing to impregnate.

May 30th.—Sunday morning from one seine haul eighty-nine, saw them cut, the roe was firm in many, apparently weeks from maturity, in others nearly ripe and dead. Evening haul ten ripe females in good condition, and milt sufficient to impregnate; weather cooler all day, nearly all impregnated; the Shad were not worried nor delayed during their run by gill nets, which fact probably explains their good condition.

May 31st.—Morning haul seventy-four; six ripe females: not a living egg; bottled what milt we could and preserved it in spring water until returning to camp, then hung it in well until evening. While waiting to make haul in the evening, procured ripe females from a giller, also two males from which obtained very little milt, used this on one lot, and bottled milt on the other: a good percentage in both lots impregnated. The defect of those that failed, may have been in eggs or milt, or both. The experiment, however, proved the possibility of preserving milt of Shad, or any other fish, alive. In both cases eggs were taken from dead fish, though caught within the hour. In one case the milt was taken from a dead fish caught at the same time as the female used; in the other it was taken several hours before, from a live fish, and kept in a bottle until wanted, we had other females, and no milt, so took the eggs dry, and kept them in an open pan until milt was obtained, in one hour and a half the two pans thus treated, did better than either of those referred to above: a large percentage impregnating. I deem the preservation of eggs much less difficult than that of milt. In both a moderately low temperature is favorable. if not essential. No ripe females from our own haul. Eggs from gillers 125,000.

June 1st.—Morning haul took twenty-three: no ripe females and but few ripe males. Bottled a small amount of milt. Our experience had led us to hope for little from our midnight haul, so we determined to try the gillers again; we found the Shad running freely and several ripe ones just caught. Mr. Wroten obtained one male which he used for one pan; the quantity was so small that very few eggs impregnated. Not finding any more males, I stripped the rest of the females, and preserved the spawn in dry pans, hoping to obtain milters from our regular haul. In order to avoid injury to the spawn from a sudden change of temperature, the air being very much colder than the water, I placed the pans which were to receive it in other pans partially filled with water. We were obliged to wait from 9:30 P. M. to 12:30 for milt. One haul yielded only forty-three fish. The majority females but none ripe; the milt flowed less freely than was desirable, but we had to use such as we could get. The results were favorable, a large percentage of the eggs developing. I omitted to state that the milt taken through the day turned out badly, probably owing to the fact that in taking it some blood and excrement dropped into the bottle. It was tested on a hundred or more good eggs. The estimate of number of eggs taken is 225,000.

June 2nd.—Noon had caught sixty three, three-fourths females; all unripe except one; eggs all dead; took some milt and bottled it.

June 3rd.—Caught fourteen, none ripe.

June 4th.—Caught forty-seven; none ripe; got eleven ripe females, and six ripe males from gillers, from which obtained 250,000 eggs, nearly all of which came up finely; used bottled milt kept nearly two days, on one lot.

June 5th.—Took no ripe fish.

June 6th.—Took no ripe fish; forty thousand young Shad were sent to Choptank safely.

June 7th.—No morning haul; evening haul caught thirty-six; three ripe; took 150,000 eggs.

June 8th.—Morning catch fifty-two, none ripe; evening catch only eight, eggs from three, milt from two; got seven spawners and four milters from gillers; took 225,000 eggs—these were all manipulated under disadvantages, but with entire success. They were obtained and managed as follows: First, we obtained from a giller's catch of six, only one ripe milter, no spawners, wiped a pan dry and took the milt, and then went in search of spawn. Found a giller with one ripe fish partially spawned, got fifteen thousand eggs, stripped them into milt and then watered sparingly, all came up; we next got from the seine one spawner and one very poor milter, from which we only got two or three drops, as the eggs were already watered it was necessary to make the best we could of this very small quantity of milt, accordingly, it was thoroughly stirred through the mass of eggs. Fearing to trust this, however, we went in search of more; in about fifteen minutes we obtained two more milters, each of which furnished a few drops, adding this we soon had the pleasure of seeing the eggs come up finely. We next took dry, the spawn of five, and proceeded a mile or more up the river in search of milt—obtained from the seine two more spawners and one milter, taking a very small quantity of the milt, not more than fifteen drops dry upon the mass of spawn already in the pan, we then added the eggs from the remaining spawners, after which enough water was added to enable us to diffuse the milt through the eggs, they were stirred with unusual force so that the milt should be as generally distributed as possible, I expected that this violence would kill a great many of the eggs, and I had little hope of securing the impregnation of more than one in five. The result, however, was the finest pan of spawn we have had this season, considering the number of eggs contained—not less than one hundred and eighty thousand.

June 9th.—Of the eggs taken last night, not one died in five hundred. Mr. Hamlen returned from Elk River, and reported the successful shipment of thiry thousand young Shad, with which he started yesterday, he took them in two fifteen gallon cans across the country by wagon, started from camp at 5.30 o'clock, A. M., and reached the river at Riebald's Wharf at 1 P. M.; temperature at starting 74°. It fell gradually during the journey and stood at 70° on reaching the river. Temperature of the river at the time of depositing them was 71°. The water was neither changed nor added to during the trip, he reports that the fish were in excellent condition when placed in the stream; 30,000 were sent yesterday for Nanticoke, but were sent by mistake to Philadelphia where they remained all night, reaching Elkton at 11 A. M. to-day. Mr. Downes reports that they stood remarkably well, only a few died. Procured 200,000 eggs from nine spawners, from the gillers chiefly—all becoming fecund.

June 10th.—Eggs of 9th looking well, those of 8th showing larger mortality than expected, those of the 7th doing well since the 2nd day—a few hatching this evening; took twenty-five ounces of eggs the evening, six thousand to the ounce, total 150,000, but got only one male Shad, from which pressed a very few drops of milt; less than one-half the eggs were impregnated.

June 11th.—Eggs of ninth not looking so well, those of 8th no worse, those of 7th rapidly hatching, those of last night as good as expected; took about ten ounces of eggs—only two drops of milt from a dead fish, all died.

June 12th.—Shipped all fish taken to Cockeysville, those of 8th hatching rapidly and in large numbers; loss of eggs much lighter than we feared, not more than ten per cent.

June 13th.—Eggs of 8th all hatched, those of 9th nearly all out, these also hatched ninety per cent.

June 14th.—Turned loose seventy-five thousand, and shipped sixty thousand to Piedmont in charge of Mr. Hamlen; broke up camp, and reported to Mr. Ferguson in Baltimore.

LIST OF FISHES

OF

MARYLAND.

EXPLANATIONS AND ABREVIATIONS.

ACAD. COLL. signifies that specimens are in the Maryland Academy of Sciences.

S. I. Specimens are in the Smithsonian Institution, at Washington.

FINS.—D. Dorsel, *i. e.*, on the back; sometimes 2 in number.

P. Pectoral; attached behind the gill-covers.

V. Ventral; attached to the lower side in front.

A. Anal; attached to the belly near the vent.

C. Caudal; the tail fin.

LIST

OF

FISHES OF MARYLAND,

BY

P. R. UHLER AND OTTO LUGGER.

A list of the fishes of our State, to be complete, should embrace the names of all the kinds which exist in all the streams, basins and bays of the region, and of the ocean along its shores. But as no systematic survey has yet been made of its various hydrographic basins, such a list cannot at present be composed. Much, however, has been done toward recognizing the prominent fishes of this territory, and the results of this knowledge are given in the following pages.

It will be seen that the greater number of species most esteemed for food in the eastern and central portions of the State belong to the Perch, Shad and Salmon groups. The first comprises in itself about one-half of all the kinds of fish most commonly offered for sale in the markets of Baltimore and the smaller cities. While these supply a source of revenue to all the tide-water districts of the State, a few forms such as the Shad and Herring, are now, or have been, the great source of wealth to the fishermen and owners of fisheries on the lower Potomac, Susquehanna, rivers of the northern part of the Eastern Shore and principal streams of the Western Shore. Until within a very few years, Shad and Herring appeared in considerable numbers in the Bush, Gunpowder, Back, Magothy, Patapsco and Patuxent rivers, but recently they have failed to appear in them ; or, as in the N. W. Branch of the Patapsco, only a few now enter to run towards the fresher waters.

While in the oyster districts, the Drum, Sheepshead, Porgy, Bay Trout, and Blue-fish or Tailor, form the principal fisheries, in the briny waters of the lower parts of the Bay and its estuaries, the Pig-fish and Spot are most highly esteemed and sought for.

Sinepuxent Bay and its connecting inlets are well supplied with Tailors, Bay Trout, Spots, Drum, Sheepshead, Yellow-tail, (called White Perch there,) Black Perch, and Black Will. In the Monocacy, upper Potomac and Susquehanna above tide-water, the Fall fish and a variety of smaller kinds of the same group form no inconsiderable part of the food of the districts. All the tributaries of the upper Potomac are now stocked, more or less considerably, with the Black Bass, which is eagerly fished for by the people of the adjacent counties.

Nor are the various species of Pike overlooked in the sluggish streams lying near to tide-water; but, one of which, the *Esox reticulatus*, is sent in winter in large numbers to Baltimore, and from this place is distributed by rail and wagon to the farmers of Carroll, Frederick and Baltimore counties.

The present list embraces every species of fish, certainly known by one or other member of our Section of Ichthyology, to have been caught in Maryland waters: excepting a few only of which the names have not yet been ascertained. Every, opportunity has been embraced to obtain full series of the fish of this State, and the results of this activity may be seen in the large collection of specimens now on exhibition in the Museum of the Maryland Academy of Sciences, and where they are daily open to the inspection of the public, free of charge for admission.

To the kind attentions of Professors Baird and Gill we are indebted for advice and aid, in the recognition of the latest system of nomenclature in the larger groups, and in the names of particular fish.

I—ORTHAGORISCIDÆ.

MOLA, Cuv.

M. rotunda.

The Ocean Sun-Fish, or Short Head.

Broad oval, blunt behind, compressed, no scales, nor lateral line. Head not distinct from the trunk, back dark grey, abdomen white, the sides soiled white with silvery reflections, a broad, almost black band, commences at the origin of the dorsal fin, is continued in front of the caudal and anal fins to the vent. Length, 3 to 4 feet.

Fin-rays:—D. 13; P. 12—13; A. 13—15; C. 8—9.

The caudal fin is connected both with the dorsal fin and the anal.

M. rotunda, Gill.

Orthagoriscus mola, DeKay, New York Fauna, fishes, p 331, pl. 59, fig. 193.

Occurs in the ocean on the coast of Worcester county.

II—DIODONTIDÆ.

DIODON, Cuv.

D. hystrix.

The Sea Porcupine.

Form oval, dilated like a cushion, but flattened on the back, beset with moderately long, white spines, which slant backwards when the creature is not irritated ; color pale brownish, beneath whitish, the sides and back with round, brown dots, and the fins with smaller, closer dots ; length extending to two feet, but always smaller in Chesapeake Bay.

Fin-rays:—D. 13; P. 25; A. 14; C. 8.

D. hystrix, Bloch, Poissons, vol. 4, pl. 126; Naturalists' Library, vol. 35, pl. 16.

Has been caught a few times with hook and line on the coast of Worcester county, and in the Chesapeake off the southern extremity of St. Mary's county.

Being covered with stout and sharp spines; it is an object of great disgust to the unlucky fisherman who chances to find one attached to the end of his line. They swell themselves into a round ball, beset in every direction with long spines, and with the spaces between the spines too small to admit the fingers of the human hand.

ACAD. COLL.

CHILOMYCTERUS, Bibron.

C. geometricus.

The Spiny Box Fish.

Body trunk-shaped, front of head abruptly descending, the whole surface, except chin and tail, covered with sharp, recurved, triangular, compressed spines, each with a three pointed base, the upper ones larger than the lower, those over the eyes quite prominent. (This species possesses the property of puffing itself up into a globular ball, and can float in this state on the surface.) Bright sea-green above, with longitudinal, olive-brown, irregular stripes on the back, and upper part of the sides, and oblique stripes below the eyes. It has eight large olive-brown spots of irregular form. Abdomen whitish. Length, 5 to 7 inches.

Fin-rays:—D. 13; P. 24; A. 12; C. 9.

C. geometricus, (Guenther VIII, p. 310.)

Diodon geometricus, Bl. Schn. p. 513, fig. 96.

— *maculato striatus,* Mitchell, Trans. Lit. & Phil. Soc. New York, I, p. 470, pl. 6, fig. 3; DeKay, New York, Fauna, Fish, p. 323, pl. 56, fig. 185.

— *rivulatus,* Cuv. Mem. Mus. IV, p. 129, pl. 6.

— *nigrolineatus,* Ayres. Journ. Bost. Soc. Nat. Hist. IV, 1842, p. 68.

— *fuliginosus,* DeKay, l. c. p. 324, pl. 55, fig. 181.

— *verrucosus,* DeKay, l. c. p. 325, pl. 56, fig. 184.

Not uncommon along the coast, entering the bays; only met with in summer, never in cold weather; sometimes common in Worcester county.

Acad. Coll. S. I.

TRICHODIODON, Bleek.

T. pilosus.

The Hairy Box Fish.

Form oval, a little flattened above, inflated. The spines are hair-like, one-eighth of an inch long in an example 1½ inch long. The large specimen in the Paris Museum (2½ feet long,) is covered with round, brown spots.

Fin-rays:—D. 12; P. 20; A. 14; C. 9.

T. pilosus, (Guenther VIII, p. 316.)

Diodon pilosus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 471, pl. 6, fig. 4.

Enters Chesapeake Bay from the ocean, but seems to be rare in Maryland waters.

III—TETRODONTIDÆ.

TETRODON, Linne'.

T. lævigatus.

The Lineated Puffer, or Smooth Swell Fish.

Body elongated, cylindrical, gradually tapering behind, anterior portion of body most prominent; abdomen pendulous, and furnished with small three-rooted spines. Uniform deep olive-green above, sides silvery, abdomen white.—Length, 1 to 2 feet.

Fin-rays:—D. 13—14; P. 16—17; A. 12; C. 11—13.

T. lævigatus, L. Syst. Nat. I, p. 411; DeKay, New York Fauna, Fishes, p. 329, pl. 56, fig. 182; Storer, Mem. Am. Acad. VIII, p. 418, pl. 34, fig. 1.

— *mathematicus*, Mitch. Lit. & Phil. Trans. New York, I, p. 474, pl. 6, fig. 6; Storer, Boston Journ. Nat. History IV, p. 183.

Atlantic coast of Worcester county and in the southern part of Chesapeake Bay.

Acad. Coll.

CHILICHTHYS, Mull.

C. turgidus.

The Common Puffer, or Rough Swell Fish.

Body oblong, cylindrical, and nearly globular when inflated. The whole surface, except the chin and the space behind dorsal and anal fins, covered with small acute spines with trifid bases; these prickles are most numerous between the eyes and on the back. Dark olive-green above, with a yellowish tinge along the sides. Sides and all beneath white, with occasionally a greenish tinge, and barred transversely by seven or eight blackish, irregularly defined bands.—Length, 6 to 12 inches.

Fin-rays:—D. 6—8; P. 15; A. 6—8; C. 6—9.

C. turdigus, Schœpff, Beabacht, Ges. Ntrf. Freune, Berlin, VIII, p. 189; Mitch. Lit. & Phil. Trans. New York, 1, p.

473, pl. 6, fig. 5; DeKay, New York Fauna, Fishes, p. 327, pl. 55, fig. 178; Storer, Mem. Am. Acad. VIII, p. 416, pl. 33, fig. 5.

Common during the summer in the St. Mary's River; said to take the hook quite readily. It is found in many sections of both peninsulas, including the Atlantic coast of Worcester county.

ACAD. COLL. S. I.

IV—OSTRACIONTIDÆ.

LACTOPHRYS, Swainson.

L. trigonus.

The Trunk Fish.

Body triangular, covered with hexagonal plates, each with six raised lines, diverging from the centre to the angles; these plates are larger posterior to the pectoral fins. A flat, prominent, recurved spine is situated on each side of the posterior portion of the abdomen. The color above is a light leaden, darker between the dorsal and caudal; abdomen white. Length, 14 inches.

Fin-rays:—D. 10; P. 12; A. 10; C. 10.

Ostracion trigonus, L. Lyst. Nat. p. 408.

— *yalei,* Storer, Bost. Journ. Nat. Hist., I, p. 353; pl. 8.

Lactophrys yalei, DeKay, New York Fauna, Fish, p. 342; Storer, Mem. Am. Ac. VIII, 1861, p. 429; (pl. 35; fig. 3.)

Occurring very rarely in the salt waters of the southern part of Chesapeake Bay, and around the extremity of St. Mary's county

ACAD. COLL. S. I.

V—BALISTIDÆ.

ALUTERA, Cuv.

A. cuspicauda.

The Long-Tailed File-Fish.

Body elongated; compressed, high; back nearly horizontal between the dorsal fin and spine; face even, sloping; abdomen regularly arched. The mouth is projected, small and upturned; scales scarcely visible. Yellowish brown, varied with irregular dashes and blotches, so that scarcely any two individuals are precisely similar. The dorsal spine is stout, short, serrated, and has a furrow behind it for its reception. Tail lancet-shaped, and nearly half the length of the body. Length, 6 to 9 inches.

Fin-rays:—D. 1.38; P. 13; V. 0; A. 42; C. 12.

A. cuspicauda, (teste Gill.)

Balistes cuspicauda, Mitch. Am. Month. Mag. II, p. 326.

Aluteres cuspicauda, DeKay, New York Fauna, Fish. p. 338; pl. 59, fig. 192; Storer, Mem. Am. Ac. VIII, 1861, p. 427; (pl. 35; fig. 2.)

Collected in the St. Mary's River, in small numbers.

ACAD. COLL.

STEPHANOLEPIS, Gill.

S. massachusettensis.

The Massachusett's Fiel-Fish.

Body oblong, very much depressed; skin covered with small stellated plates, which are so disposed as to feel slightly rough only when the hand is moved towards the head.—The strong, granulated, curved spine, representing the first dorsal fin, is half the length of the head, and has a double series of sharp, decurved teeth behind; yellowish brown, with faint abbreviated brownish blotches along the sides, most obvious upon the upper portion. Length, 3 to 4 inches.

Fin-rays:—D. 1, 34; P. 12—15; A. 30—34; C. 12—13.

Monocanthus Massachusettensis, Storer, Fish. Mass. p. 174, and Mem. Am. Ac. VIII, p. 425, (pl. 34, fig. 4); DeKay, New York Fauna, Fishes, p. 336; pl. 57; fig. 187.

Enters Chesapeake Bay from the ocean. Belongs to the region of salt water.

VI—HIPPOCAMPIDÆ.

HIPPOCAMPUS, Leach.

H. hudsonius.

The Hudson River Sea-Horse.

Body heptagonal, composed of twelve segments, armed each side with three rows of prominent spines, formed by the junction of the plates, and a single row beneath. On the summit of the head is a large bony protuberance, terminating in five distinct points. Length of the head is more than one-fifth the entire length, and the prehensile tail is longer than the body, quadrangular, and divided into 32 segments. Color light brown, with iridescent opercles. Length, 3 to 6 inches.

D. 18; P. 15; A. 3.

H. hudsonius, DeKay, Faun. New York, Fish, p. 322; pl. 53; fig. 171; Storer, Mem. Am. Acad II, p. 491, and VIII, p. 416; pl. 33; fig. 4; Lockwood, Amer. Nat. 1867, p. 225.

— *brevirostris*, Storer, Report p. 167.

Syngnathus hippocampus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 475.

Enters the brackish water from the ocean, but seems to be uncommon. Specimens have been taken in St. Mary's River, in Sinepuxent Bay, on the ocean coast of Worcester county, and in Chincoteague Bay.

ACAD. COLL.

VII—SYNGNATHIDÆ.

SYNGNATHUS, Artedi.

S. peckianus.

The Banded, or Smaller Pipe-Fish.

Body elongate, compressed upon the sides, flattened above, gradually tapering from the head to the tail, and covered with horny plates. Greenish brown above, with several irregular, transverse, broad, dark bands; numerous narrower bands of the same color upon the sides. Abdomen pinkish. Length, 6 to 10 inches.

Fin-rays:—D. 45; P. 14; A. 3; C. 12.

S. peckianus, (Guenther.)

— *peckianus*, Storer, Report p. 163 and Synops. Fishes N. Amer. p. 490, and Mem. Am. Ac. VIII, p. 412; pl. 33; fig. 3.

— *fuscus*, Storer, Report, p. 162.

— *fasciatus*, DeKay, New York Faun. Fishes, p. 319; pl. 54; fig. 174.

— *viridescens*, DeKay, l. c. p. 321; pl. 54; fig. 176.

Occurs in the mouths of large rivers near salt water.

One specimen has been recently obtained from the St. Mary's River.

ACAD. COLL.

VIII—MALTHEIDÆ.

MALTHE, Cuv.

M. vespertilio.

Bat-Fish, Sea Bat, Nose-Fish.

Seen from above the body is ovate, depressed, expanded sideways like shoulders, to which the pectoral fins are attached, and tapering towards the tail. Skin like shagreen, with scattering long tubercles. Pale grayish-brown above, and pale reddish beneath. Length, 10 to 18 inches.

Fin-rays:—D. 4; P. 11; V. 5; A. 4; C. 9.

M. vespertilio, Linn. Cuv. & Val. XII, p. 446; Cuv. Regne Anim. Il. Poiss., pl. 85; fig. 2; DeKay, New York Fauna, Fishes, p. 167.

Rare in the southern part of Chesapeake Bay.

Acad. Coll.

IX—LOPHIDÆ.

LOPHIUS, Artedi.

L. americanus.

The American Angler, Goose or Monk-Fish.

Body flat, head broad and depressed. Surface covered with a smooth skin, with fleshy processes along the flanks, extending to the base of the caudal fin. Olive brown above, beneath white. Length, 2 to 3 feet.

The first isolated ray of the first dorsal fin is very long, and supports on its apex a fleshy slip.

Fin-rays:—D. 3, 3, 12; P. 25; V. 1, 5; A. 10; C. 9.

L americanus, Cuv. & Val. XII, p. 380; DeKay, New York Fauna, Fishes, p. 162; pl. 28; fig. 87.

Found in the salt waters near and in the ocean, and in the drains of Worcester county.

X—ANTENNARIIDÆ.

PTEROPHRYNE, Gill.

P. laevigata.

The Smooth Mouse-Fish, or Toad-Fish.

Body compressed, thickest about the pectorals; greatest depth half of the total length. Surface of the body smooth.

Brown, tinged with reddish, with irregular blackish and small white spots on the sides; brown transverse, bars across the dorsal, pectoral and caudal fins.

Between the eyes is a cylindrical soft ray, and behind and above this are two other soft rays, enveloped in a common granular membrane. Length, 2 inches.

Fin-rays:—D. 11; P. 8; V. 7; C. 9.

Chironectes lævigatus, Cuv. Mem. Mus. III, p. 423; pl. 16; fig. 1; Storer, Rep. Mass., p. 73; DeKay, New York Fauna, Fish, p. 165; pl. 27; fig. 83.

Occurs in the oyster regions of Chesapeake Bay, but is perhaps quite uncommon.

XI—SOLEIDÆ.

ACHIRUS, Lac.

A. lineatus.

The Hog Choker; The American Sole.

Oval, approaching to orbicular, flat; scales small, ascending high upon the dorsal, aval and caudal fins, lateral line nearly straight. Head, body and fins, greenish brown, with numerous black blotches. Eyes, and colored surface on the right side.

There are two patterns of marking on this species of fish, the one with zig-zag bands, and the other spotted; some of the intermediate links are in the collection of the Maryland Academy of Sciences. Length, 3 to 6 inches.

Fin-rays:—D. 56; V. 4; A. 40; C. 16.

Pleuronectes achirus, L. Syst. Nat. 10th edit, I, p. 268.

Achirus fasciatus, Lacep. IV, pp. 659, 662.

Pleuronectes mollis, Mitch. in Lit. & Phil. Trans. New York, I, p. 388; pl. 2; fig. 4.

Achirus lineatus, Cuv. Regne Anim.

— *mollis*, Storer, Syn. Fish, N. A., p. 228, and Fish, Massach. p. 149; DeKay, New York Fauna, Fish, p. 303; pl. 49; fig. 159.

Solea achirus, Guenth, IV, p. 476.

Immensely abundant in the Potomac River, south of Fort Washington; also in its tributaries in Charles and St. Mary's counties.

Acad. Coll. S. I.

XII—PLEURONECTIDÆ.

PSEUDOPLEURONECTES, Bl'kr.

P. americanus.

The Common Flounder.--The New York Flat-Fish.

Elliptical, flat. Scales small and of nearly equal size throughout. Just before the anal fin is a sharp horizontal spine; lateral line makes a slight curve above the pectoral fin; eyes and colored surface on the right; color very variable, usually pale greenish, with small brownish, irregular clouds or patches over the body and fins: beneath pearly white. Length, 6 to 18 inches.

Fin-rays:—D. 67; P. 10; V. 6; A. 46; C. 17.

Pleuronectes americanus, Walb. Art. III, p. 113.

—*plana*, Mitch. in Phil. & Lit. Trans. New York, I, p. 387.

Platessa plana, Storer. Fishes, Massach. p. 140; DeKay, New York Faun. Fishes, p. 295; pl. 48; fig. 154: pl. 49; fig. pl. 49.

—*pusilla*, DeKay, l. c. p. 296; pl. 47; fig. 153.

Occasionally seen in our market, but never in large numbers. It comes from the southern part of Chesapeake Bay. Also, in the Potomac River on the coast of St. Mary's county.

Acad. Coll.

MYZOPSENTTA, Gill.

M. ferruginea.

The Rusty Flat-Fish.

Elliptical, flat. Scales cover the opercular plates, and are smaller towards the abdomen and tail. Lateral line curves suddenly over the pectoral fin, and runs thence in a straight line. Head and body greenish, with numerous irregular, rust-colored spots not extending over the fins. Four or five obscure, rounded spots along the dorsal and abdominal outline. Length, 12 to 20 inches.

Fin-rays:—D. 81; P. 10; V. 6; A. 59; C. 14.

Platessa ferruginea, Storer, Fishes, Massach. p. 141; pl. 2; DeKay, New York Fauna, Fishes, p. 297; pl. 48; fig. 155.

Pleuronectes ferrugineus, Guenth, IV, p. 447.

Occasional in the southern part of Chesapeake Bay.

LOPHOPSETTA, Gill.

L. maculata.

The Spotted Turbot.

Nearly orbicular and flat; scales minute and adherent; lateral line regularly arched over the pectoral, and then straight in a slight furrow to the tail; dark olive-brown above, with rounded, deep chocolate-brown spots on the body, and a few distant, light-colored spots, underside bluish white.—Eyes and colored surface on the left. Length, 12 to 18 inches.

Pleuronectes maculatus, Mitch. Report in part on the fishes of New York, p. 9; DeKay, New York Fauna, Fishes, p. 301; pl. 47; fig. 151.

Rhombus aquosus, Cuv. Regne Anim. Guenther, IV, p. 411.

Several years since this species was frequently brought to the Baltimore markets from the Eastern Shore, but for a few years past it has not been brought to this city.

CHÆNOPSETTA, Gill.

C. ocellaris.

The Long-Toothed Flounder, or Oblong Flounder.

Body oblong and flat. Scales adherent, and extending over the opercles. Lateral line with a short and rapid curve over the pectorals, and thence straight. Olive brown, with from 6 to 10 black spots bordered with white, and numerous obscure pale spots. Eyes and colored surface on the left.—Length, 12 to 18 inches.

Fin-rays:—D. 95; P. 12; V. 6; A. 72; C. 16.

Platessa ocellaris, DeKay, New York Fauna Fishes, p. 300; pl. 47; fig. 152.

Pleauronectes oblongus, Mitch. in Trans. Lit. & Phil. Soc. New York, I, p. 391.

Platessa oblonga, DeKay, New York Fauna, Fishes, p. 299, pl. 48, fig. 156.

Pseudorhombus oblongus, Guenth. III, p. 426.

Grows to be 2 feet in length, and is caught in seines on both shores of Chesapeake Bay in its more southern parts.

Strings of the medium and smaller sizes find a ready sale in the Baltimore markets.

Acad. Coll. S. I.

XIII—AMMODYTIDÆ.

AMMODYTES, Artedi.

A. americanus.

Sand Lance.

Body elongate, subcompressed, covered with very minute scales. Head flattened above, compressed on the sides.—Head and body above bluish brown, intermixed with silvery and light green: sides and beneath silvery. Length, 6 to 12 inches.

D. 56; P. 13; A. 27; C. 17.

A. americanus, Guenther, I, p. 386.

— *tobianus*, Mitch. Lit. & Phil. Trans. New York, I, p. 363; Storer, Fishes Massach , 159.

— *americanus*, DeKay, New York Fauna, Fishes, p. 317; pl. 53, fig. 167.

Occasional in the Ocean on the coast of Worcester county.

XIV—BLENNIIDÆ.

BLENNIUS, Artedi.

B. fucorum.

Sea-Weed Blenny.

Body small, cylindrical, and scaleless; head large, deeper than long; the large and very prominent eyes project beyond the face; a thread-shape cirrus, bifid at tip, and nearly as long as the head, projects from the upper part of each orbit. Soiled greenish, brownish above, with numerous brown spots on the cheeks and sides of the body; throat and belly faintly rosaceous. Length, 1 to 2 inches.

Fin-rays:—D. 11.17; P. 14; V. 3; A. 18; C. 14.

B. fucorum, Cuv. & Val. XI, p. 263, pl. 324; DeKay, New York Fauna, Fishes, p. 149, pl. 22, fig. 66.

Inhabits the Ocean drains of Worcester county, and in the oyster regions south of Tangier Sound.

CHASMODES, Cuv. & Val.

C. quadrifasciatus.

Four-Banded Shanny.

Body cylindrical, with a thick head; mouth very large; dorsal fin not connected with the caudal. Color light brown, with four (or five) brown cross-bands; along the base of the anal fin is a series of round yellowish spots. Length, 2½ inches.

Fin-rays:—D. 27; P. 14; V. 2; A. 15; C. 15.

C. quadrifasciatus, Guenther, III, p. 229.

Pholis quadrifasciatus, Wood, Journ. Acad. Nat. Sc., Phila., IV, p. 282, pl. 17, fig. 1.

Chasmodes quadrifasciatus, Cuv. & Val. XI, p. 298.

Found in St. Mary's River, and near the mouth of the Potomac.

ACAD. COLL.

XV—BATRACHIDÆ.

BATRACHUS, Boch. Schn.

B. tau.

Oyster Fish, or Common Toad Fish.

Body thick, rounded before, compressed behind. Head very broad, depressed, as wide as long, with full cheeks, appearing as if bloated. Mouth enormous; eyes prominent and close together. Skin without scales, covered with a thick coat of slime. Color light brown, clouded and mottled with dark brown and olive-green; belly flesh-colored.—Length, 6 to 12 inches.

Fin-rays:—D. 3.26; P. 18; V. 3; A. 21; C. 15.

B. tau, Guenther III, p. 167.

Gadus tau, L. Syst. I, p. 440.

Lophius bufo, Mitch. Lit. & Phil. Trans. New York, I, p. 463.

Batrachoides vernullus, Lesueur, Mem. Mus. V, p. 157, pl. 17.

Batrachus variegatus, Storer, Rep. Massach. p. 74.

— *tau,* Cuv. & Val. XII, p. 478; DeKay, New York Fauna, Fishes, p. 168, pl. 28, fig. 86.

— *celatus,* DeKay, l. c. p. 170, pl. 50, fig. 161, (young.)

Lives in the mud of the oyster regions of Chesapeake Bay, around the mouth of the Potomac River and elsewhere in salt water.

ACAD. COLL. S. I.

XVI—URANOSCOPIDÆ.

ASTROSCOPUS, Brev.

A. anoplus.

Unarmed Uranoscope.

Body cylindrical, without scales; head large and flattened; eyes large, vertical, close together. Back above greenish, and, together with the extremity of the lower jaw, minutely punctate with black. First dorsal fin blackish; pectorals greenish; the remaining fins white, tinged with yellow.—Length, 2 inches.

Fin-rays:—D. 4.1.12; P. 19; V. 1.5; A. 12; C. 11.

Uranoscopus anoplos, Cuv. & Val. VIII, p. 493: DeKay, New York Fauna, Fishes, p. 37, pl. 22, fig. 65.

Astroscopus anoplus, Baird's Rep.

Agnus anoplus, Guenther II, p. 229.

Occurs occasionally in the southern part of Chesapeake Bay.

XVII—CYCLOPTERIDÆ.

CYCLOPTERUS, Artedi.

C. lumpus.

Common Lump-Fish, or Lump-Sucker.

A remarkably thick and stout fish, nearly orbicular in outline, looking like a lump of gelatinous matter. The scaleless skin is roughened by warts, forming three rows of lumps or processes on each side. On the ridge of the back are 5 to 7 large, compressed warts, behind which is a deep oblique fissure. These lumps or processes look like the plates on the sides of a Sturgeon, but are not so hard or well defined. The belly is broad and flat, with an eliptical organ formed by the pectoral fins for adhering to other bodies. Back and sides deep blue, thickly marked with small black elevations; belly pale green and white. Length, 10 to 20 inches.

Fin-rays:—D. 12; P. 20; A. 10; C. 11.

C. lumpus, L. Syst. Nat. I, p. 414; Richards, Fauna Bor. Amer. Fishes, p. 260.

— *cæruleus*, Mitch. Lit. & Phil. Soc. New York, I, p. 480, pl. 2, fig. 7.

In the ocean drains of Worcester county.

XVIII—GOBIIDÆ.

GOBIOSOMA, Girard.

G. alepidota.

Variegated Goby.

Body oblong, cylindrical, slightly compressed on the sides; its surface totally destitute of scales. Head broad, flattened behind the eyes, which are very close together, and only separated by a narrow furrow. Greenish brown, with seven or eight paler transverse bars over body and tail; fins dark brown, caudal fin with two or three curved bars. Length, 2 to 3 inches.

Fin-rays:—D. 6, 14; P. 17; V. 12—13; A. 11; C. 19.

G. alepidota, Guenther III, p. 85.

Gobius alepidotus, Sch., p. 547; DeKay, New York Fauna, Fishes, p. 160, pl. 23, fig. 70.

— *boscii*, Lacep I, p. 555, pl. 16, fig. 1.

— *viridipallidus*, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 379, pl. 1, fig. 8.

Gobiosoma aledpidotum, Girard Proc. Acad. Nat. Sc. Phil. 1858, p. 169.

In the waters of Worcester county, along the shores of Sinepuxent Bay. Probably scarce.

GOBIESOX.

G. stoumosus.

Head exceedingly wide, width $2\frac{5}{6}$ths times in total including caudal fin. This width is partly produced by a large, fleshy mass, which extends from the end of the prominent extremity of the maxillary bone to the end of the interoperculum. Subopercular spine short, stout. Eyes small, over seven times in head, more than twice in muzzle. Bluish-lead color; fins blackish. Length, $2\frac{1}{2}$ inches.

G. strumosus, Cope, Proc. Ac. Nat. Sc. of Philad., 1870, p. 121.

Often found on the oyster-beds, living in the shells. Several specimens were obtained from the mouth of Magothy River.

XIX—TRIGLIDÆ.

DACTYLOPTERUS, Lacep.

D. volitans.

Sea-Swallow.

Body cylindrical, tapering towards the tail. Head four-sided, broader than high, descending nearly vertically in front. Body covered with rough, solid scales, with a prominent crest on each. The pectoral fins consist of two portions, of which the posterior one is the largest, forming wings.—Light brown above, darker on the summit of the head, with irregular darker spots. Sides silvery, with flesh color predominating beneath. Dorsals gray, with brown spots on the membrane of the first. The posterior pectoral blackish, with bluish spots; the anterior dark brown, varied with black.—Ventrals and anal fins flesh colored. Caudal fin light brown, with irregular brownish bands. Length, 6 inches.

Fin-rays:—D. 2, 4, 1, 8: P. 6, 30: V. 1, 4: A. 6: C. 10.

D. volitans, Guenther, I, p. 221.

Trigla volitans, L. Gm. p. 1346; Bl. Taf. 351.

Dactylopterus pirapeda, Lecep, III, p. 326.

— *volitans*, Cuv. & Val. IV, p. 117; DeKay, New York Fauna, Fishes, p. 49, pl. 17, fig. 46.

Polynemus sexradiatus, Mitch. Trans. Lit. & Phil. Soc. New York, I, pl. 4 fig. 10, and Am. Monthy Mag. I, p. 323.

In the tide drains on the ocean coast of Worcester county, and in the lower part of Chesapeake Bay.

ACAD. COLL.

PRIONOTUS (Lacep.) Cuv. & Val.

1—P. lineatus.

Banded Gurnard, or Sea-Robin.

Cylindrical, broadened in front, tapering rapidly towards the tail; head broader than the body, composed of seven distinct bony plates, the first rough, covering the whole front and upper part of the head, ending behind in two stout spines: over the eyes both before and behind are smaller spines; and with a stout spine at the base of the forward gill-cover, at tached to a serrated ridge; gill-cover triangular, with two spines behind, the upper one directed upwards, and the lower one larger and directed backwards. Scales small; the lateral line curving downwards from the upper part of the gill openings. Fingers three, long, placed under the base of the pectoral fins, the longest being nearly one-half as long as these fins. First dorsal set in a groove, the first ray serrated along its whole length, and the two following rays less serrated: the pectoral fins extend to the middle of the second dorsal, broad and bluntly pointed, almost black and with reddish bands; caudal uneven, slightly reddish, almost lunate. Color rich dark drown, or tinged with slaty, with darker brown blotches irregularly placed; sides cream-yellow, marked with patches of iron-rust color; lateral line brown: beneath this is a broad reddish brown line extending to the tip, and there breaking up into series of short lines and spots: first dorsal pale with a black spot between the fourth and sixth rays; and reddish. Length, 9—18 inches.

Fin-rays:—D. 9, 12; P. 13, 3; V. 1, 5; A. 11; C. 15.

P. lineatus, Guenther II, p. 192.

Trigla lineata, Mitchell, Trans. Lit. & Phil. Soc. New York, I, p. 430, pl. 4, fig. 4.

Prionotus strigatus, Cuv. & Val. IV, p. 86.

— *lineatus*, DeKay, New York, Fauna, Fishes, p. 45, pl. 4, fig. 12.

Occurs in the same localities as the preceding species

Acad. Coll.

2—P. carolinus.

Web-Fingered Gurnard.

Body cylindrical, tapering towards the tail. Head depressed, with a deep depression between the eyes, and ending in a bilobed snout: each lobe is furnished with blunt spines in front. Scales small, nearly square. Pectorals very large and broad, like wings; the fingers or fleshy processes, three in number, serve as important organs of touch. Color grayish, or chocolate brown. Dorsal and anal fins with pale, oblique bars. The first dorsal fin with a dusky, roundish spot between the fourth and fifth ray. Four to six obscure brownish bands across the back, obsolete on the sides.—Length, 12 inches.

Fin-rays:—D. 10, 14; P. 14; V. 5; A. 12; C. 11.

P. carolinus, Guenther, II, p. 192.

Trigla carolina, L. Mantissa, p. 528.

— *palmipes*, Mitchell, Trans. Lit. & Phil. Soc. New York, I, p. 431, pl. 4, fig. 5.

Prionotus pilatus, Storer, Proc. Boston Nat. Hist, II, p. 77, and Report Fishes Massach., p. 20, pl. 6, fig. 1: Baird, ninth Smithson. Report, p. 321.

— *carolinus*, Cuv. & Val., III, p. 90: Storer, Report. p. 14; DeKay, New York Fauna, Fishes, p. 46, pl. 5, fig. 15.

Not uncommon about the mouth of the Potomac River, in Sinepuxent Bay, and along the eastern shore south of Tangier Sound.

Acad. Coll. S. I.

XX—COTTIDÆ.

URANIDEA.

1—U. meridionalis.

Barbut, or Miller's Thumb.

Form somewhat cylindrical, tapering posteriorily; head broader, forming nearly one-fourth of the total length, and being about as broad as long, rounded in front; with three spines on the forward gill-cover, the upper one stout, directed obliquely upwards and backwards; the intermediate one smaller, directed vertically downwards, and the lower one, still smaller, projecting obliquely forwards; the first dorsal fin commences a little behind the insertion of the ventral, its upper edge convexly curved; caudal fin shorter than the head, its posterior edge convex; color pale yellowish-gray, with slightly darker blotches, and on the fins with obsolente bands, composed of brownish spots. Length about 3 inches.

Fin-rays:—D. 7, 17; P. 14; V. 1, 4; A. 12; C. 17.

Cottus meridionalis, Girard, Smithsonian Contrib'n III, 1852, p. 47, pl. 1, fig. 9 & 10; Proc. Bost. Soc. Nat. Hist. III, 1850, p. 189, and Proc. Amer. Assoc. Adv. Sc. II, 1850, p. 410.

It has been taken near Cumberland, and at Rohrersville, in Washington county.

Acad. Coll.

2—U. viscosa.

Barbut, or Miller's Thumb.

Somewhat cylindrical, tapering posteriorily, head broader, convex, a little flattened, nose convex and snout obtuse, mouth wide, but less so than in the preceding species, and its angles do not extend back farther than the front rim of the eye; diameter of the eye contained about five times in the length of the head; spine of the forward gill-cover stout. prominent, acute, directed obliquely upwards, sometimes a smaller spine occurs at the base below this, having its point directed straight downwards; the one on the lower angle of the gill-cover is very conspicuous, acute, and directed as usual downwards and forwards; first dorsal fin uniformly arched, as is also the second dorsal; the origin of the anal fin is under the position of the fourth ray of the second dorsal: the caudal forms two-elevenths of the entire lenth; the ventral is inserted in advance of the position of the first dorsal fin. Color yellowish, clouded with blackish, the first dorsal fin margined narrowly with orange. Length, 3—3¾ inches.

Fin-rays:—D. 8, 17; P. 12; V. 1, 3; A. 12; C. 18.

C. viscosus, Haldem, Suppl. Monogr, Limn. & C., 1840, p. 3; Girard, Proc. Amer. Assoc. Adv. Sc. II, 1850, p. 441: Proc. Bost. Soc. Nat. Hist. III, 1850, p. 189; and Smith's Contrib. III, 1852, p. 51; pl. 2; fig. 1, 2; pl. 3; fig. 1—9.

Not the Miller's Thumb of Annapolis, West River and the Patuxent, which belongs to the group of Toad Fishes. It occurs in Rock Creek, near Georgetown, D of C., and in some of the small streams near Baltimore.

XXI—HEMITRIPTERIDÆ.

HEMITRIPTERUS, Cuv. & Val.

H. acadianus.

American Sea Raven.

Body oblong, cylindrical, tapering rapidly to the tail; head large, with irregular cavities, knobs and elevations: above the snout is an elevated crest on each side, with spinous projections; from several of these prominences arise finger-like slips, also ten or twelve similar ones are pendant from the lower jaw; surface of body covered with a granulated skin, upon which are rows of small conical tubercles. Surface of head, body and fins bright lemon-yellow or blood-red. Length, 1 to 2 feet.

Fin-rays:—D. 16, 14; P. 18; V. 1, 3; A. 14; C. 12.

Cottus acadianus, Penn. Arct. Zool. III, p. 371.

— *tripterygius*, Bl. Schn., p. 63.

— *hispidus*, Bl. Schn., p. 63; pl. 13.

Scorpæna flava, Mitch. Trans. Lit. & Phil. Soc. New York I, p. 382; pl. 2; fig. 8.

— *purpurea et rufe*, Mitch. Amer. Month, Mag. II, p. 245.

Hemitripterus americanus, Cuv. & Val. IV, p. 268; pl. 84: Storer, Rep. Mass. p. 23; DeKay, New York Fauna, Fishes, p. 56; pl. 6; fig. 16; Cuv. Regne Anim. Ill. Poiss. pl. 22: fig. 1; Guenther, II, p. 143.

This species has occurred a few times in the seines hauled near the entrance to Chesapeake Bay and on the sea coast: but it must be in general rare in Maryland. It belongs more particularly to the coast of New England.

XXII—LABRIDÆ.

TAUTOGA, Mitch.

T. onitis.

Black-fish, or New York Tautog.

Body elongate, compressed, and highest just above the dorsal fin; scales small, adherent; very small on the top of the head; lips thick and very fleshy. The color is remarkably varied, but generally black, deep black or bluish-black; frequently pale bluish, with irregular bands of a deeper hue: lips, lower jaw and abdomen lighter, sprinkled with black points. Length, 6 to 18 inches.

Fin-rays:—D. 17, 10: P. 17: V. 1, 5: A. 3, 8: C. 14.

T. onitis, Guenther III, p. 88.

Labrus onitis, L. Syst. Nat. I, p. 478; Lacep. III, p. 501.

— *americanus*, Storer, Syn., p. 137.

Tautoga nigra, Mich. Report Fish, New York, 1814, p. 23.

Labrus tautoga, Mitch. in Lit. & Phil. Trans. New York, 1, p. 398, pl. 3, fig. 1.

Tautoga nigra, Cuv. & Val. XIII, p. 293: DeKay, New York Fauna, Fishes, p. 175; pl. 14; fig. 39.

Caught on the ocean coast of Worcester county, and around the mouth of Chesapeake Bay. Feeds on mud crabs and shell-fish.

ACAD. COLL. S. I.

XXIII—EPHIPPIDÆ.

PAREPHIPPUS, Gill.

P. faber.

Banded Ephippus.

Form regularly oval; its height to its total length as four to seven; scales moderately large, ascending more than two-thirds of the distance along the fins: the dorsal fin consists of two portions; the first is formed by nine very short spines, the second is large and triangular; the anal is similar in shape and size to the second dorsal fin. Brownish, with six broad, vertical, dusky, bluish bands. Total length, 9 inches.

Fin-rays:—D. 8, 1, 22; P. 17—18; V. 1, 5; A. 3, 18; C. 16—17.

Chætodon faber, Bl. Taf. 212; fig. 2.

— *oviformis*, Mitch. Trans. Lit. & Phil. Soc. New York, I, pl. 5; fig. 4.

Ephippus faber, Cuv. & Val. VII, p. 213; DeKay, New York Fauna, Fishes, p. 97; pl. 23; fig. 68; Holbr. Ichth. S Carol. p. 108; pl. 15; fig. 1; Guenth, II, p. 1.

Not uncommon in the salt waters of the region near the entrance to Chesapeske Bay, but is seldom, if ever, brought to the Baltimore markets.

Farther south it is caught in considerable numbers, and is regarded with favor as an article of food.

Acad. Coll. S. I.

XXIV—XIPHIDÆ.

XIPHIAS, Artedi.

X. gladius.

Sword-fish.

Body elongate, cylindrical, highest near the beginning of the pectoral fin. Surface of body and head slightly roughened, with numerous series of tubercles, which disappear with age. Upper jaw short and pointed. The dorsal is a long, high, and nearly equal fin of 43 rays, extending nearly to the tail, but becoming for the greater part obliterated and divided into two fins. No ventral fins. The anal fin is likewise in the adult divided into two. Caudal fin crescent-shaped. Bluish-black above, silvery on the sides: sword dark brown above, whitish beneath. Length, 10 to 15 feet.

Fin-rays:—Young:—D. 3, 40; P. 16; A. 17; C. 17.
Adult:—D. 18, 3; P. 16; A. 11, 3; C. 17.

X gladius, L. Syst. I, p. 432; Cuv. & Val. III, p. 255; pl. 225, 226; Storer, Report, p. 51: DeKay, New York Fauna, Fishes, p. 111.

Some times enters Chesapeake Bay from the Ocean.

XXV—SCOMBRIDÆ.

SCOMBER, Artedi.

1—S. scombrus.

Common Mackerel.

This important fish has a cylindrical, tapering form. Scales very minute. Eyes large. With longitudinal spurious fins on the sides of the tail, and a low spine before the first ray of the anal fin. Colors exceedingly vivid; dark steel-blue above, becoming lighter on the sides, beneath silvery white; with 24 to 30 vertical, deep-blue half-bands, and a black blotch at the base of the pectorals and ventrals. Length, 16 to 18 inches.

Fin-rays:—D. 13, 10—VI, P. 17; V. 6; A. 12—V, C. 15.

S. scombrus, L. Syst. I, p. 492.

S. vernalis, Mitch. Trans. Lit. & Phil. Soc. New York, I, 423; Cuv. & Val. VIII, p. 48; Storer, Fishes, Massach. p. 41; DeKay, New York Fanua, Fishes, p. 101; pl. 12; fig. 34.

Much less common than formerly in the salt-water of Chesapeake Bay not remote from the Ocean.

ACAD. COLL.

2—S. colias.

Chub-Mackerel.

Body cylindrical, robust. Head considerably flattened above; eyes large. The first dorsal fin transparent; five dorsal finlets. Above light green, with numerous undulating, darker green lines passing down the sides, just crossing the lateral line. Beneath dull bluish, with large, round or oval, brown blotches distributed irregularly on the sides. Abdomen light-colored. Length, 1 to 2 feet.

Fin-rays:—D. 9, 12—V; P. 19; V. 5; A. 1, 12—V; C. 17.

S. colias, L. Gm. I, p. 1329; Lacep. IV, pp. 39, 40; Cuv. & Val. VIII, p. 39; pl. 209; Storer, Fishes of Massach. p. 45; DeKay, New York Fauna, Fishes, p. 104; pl. 11; fig. 33.

Enters the Chesapeake Bay from the ocean, but must be quite uncommon in Maryland waters.

SARDA, Cuv.

S. pelamys.

Striped Bonito, or Skip-Jack.

Has the general form of the common Mackerel, but is a larger and more robust fish; its height to its length is as one to four. The scales are scarcely visible, except upon the so-called corselet, which is of a triangular shape, extending from the gill-opening to beyond the tip of the pectorals. Summit of head and upper part of the sides dark-plumbeous; abdomen and sides ashen grey, mixed with blue. There are 6—8 parallel, longitudinal, narrow, dark stripes, and (in young individuals) 6—8 broad, vertical, deep-blue bands, crossing the narrow longitudinal stripes at right angles. They become effaced, or are entirely wanting, in older specimens. Length, 12 to 20 inches.

Fin-rays:—D. 22, 2, 12—IX; P. 24; V. 1, 5; A. 2, 12—VIII; C. 27.

Pelamys sarda, Cuv. & Val. VIII, p. 149; pl. 217; Storer, Fishes, Massach. p. 4; DeKay, New York Fauna, Fishes, p. 106; pl. 6; fig. 27; Cuv. Regne. Anim. Ill. Poiss. pl. 48; fig. 2.

Scomber sarda, Bloch, X, p. 35; Taf. 334; Bl. Schn. p. 22; Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 428.

Found rarely near the entrance to Chesapeake Bay.

Acad. Coll.

CYBIUM, Cuv.

1—C. maculatum.

Bay Mackerel, or the Spanish Mackerel.

Similar in shape and appearance to *Scomber colias*; head pointed, and to the whole length as about 1 to 6; eyes and mouth large; greenish above, shading into ashen-grey; sides and all beneath white; about twenty yellowish rounded spots are distributed irregularly along the sides. First dorsal fin, as far as the eighth or ninth ray, black; pectorals black, with brown margins; ventrals and anals whitish. Length, 18 to 24 inches.

Fin-rays:—D. 17, 2, 15—X, or 16, 1, 15—VIII; P. 19—22; V. 1, 5; A. 2, 15—VIII—IX; C. 22.

C. maculatum, Guenther, II, p. 372.

Scomber maculatus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 426; pl. 6; fig. 8.

Cybium maculatum, Agassiz in Spix, Pisc. Brasil. p. 103: tab. 60; Cuv. & Val. VIII, p. 181; Storer, Bost. Journal, IV, p. 179; DeKay, New York Fauna, Fishes, p. 108; pl. 73; fig. 232; Holbr. Ichth. S. Car. p. 66; pl. 9; fig. 1.

Has been caught in large numbers in the Potomac River near its mouth; it is considered a great delicacy and as one of the finest food-fish in the market.

It is more solitary than the other fishes of the Mackerel family generally, and only 4 or 5 are taken at the same time.

Acad. Coll. S. I.

2—C. regale.

Black-Spotted Spanish Mackerel, King-fish, or Cero.

Similar to the preceding, but with a broad, brownish, longitudinal stripe, and with roundish spots above and beneath.

C. regale, Guenther, II, p. 372.

Scomber regalis, Bloch, taf., 333; Lacep. IV, p. 711—V; p. 789.

Cybium regale, Cuv. & Val. VIII, p. 184.

Brought occasionally in small numbers from Chesapeake Bay near the Ocean, and commands a ready sale in the Baltimore markets.

Acad. Coll. S. I.

XXVI—CARANGIDÆ.

VOMER, Cuv.

V. setipinnis.

Blunt-Nosed Shiner, Horse-fish, or Bristly Dory.

Nearly oval in shape, body strongly compressed; tail small, cylindrical; back abruptly descending above the eye, forming a cancave profile; no scales on the upper part of the body above the lateral line, and very small ones on the sides, becoming larger on the tail; except on the long pectoral fins, all the rays are short; the whole body is of a lustrous silvery color, passing into leaden on the back; membrane of the second dorsal minutely punctured with black, tinged at its base with light yellow.

Fin-rays:—D. 7, 1, 23; P. 1, 18; V. 1, 3; A. 1, 18; C. 16.

Zeus setapinnis, Mitch. Trans. Lit. & Phil. Soc. New York. I, p. 384; pl. 1; fig. 9.

Vomer brownii, Cuv. Regne. Anim. Agass. Spix, Pisc. Bras. p. 110; tab. 57; DeKay, New York Fauna. Fishes, p. 127; pl. 25; fig. 78.

Argyreiosus setipinnis, Guenther, II, p. 459.

Not rare in Sinepuxent Bay, and in the southern parts of Chesapeake Bay.

ACAD. COLL.

ARGYREIOSUS, Lacep.

A. vomer.

Rostrated Dory.

Similar in shape to *Vomer setipinnis;* face oblique in front, horizontal from the nape to the second dorsal fin; snout prominent, projecting; tail very slender. Skin satin-like, without scales. The second ray of the first dorsal fin elongated into a thread half as long as the body, and sometimes twice as long; the second ray of the second dorsal fin also very long; pectorals long; ventral and anal fins very long. Lustrous silvery; dorsal and ventral filaments blackish. Length, 8 inches.

Fin-rays:—1st D. 1, 44; 2nd D. 1, 22; P. 17; V. 1, 5; A. 2, 1, 18; C. 17.

A. vomer, Lacep. IV, pp. 566, 567: Agass. Spix, Pisc. Bras. p. 109; tab. 58; Cuv. & Val. IX, p. 177; pl. 255; Cuv. Regne. Anim. Ill. Poiss. pl. 59; fig. 2; DeKay, New York Fauna, Fishes, p. 124; pl. 75; fig. 238.

Zeus niger, Bl. Schn., p. 90.

In the Potomac River near its mouth, in Sinepuxent Bay, and in the southern part of Chesapeake Bay: not rare.

ACAD. COLL.

CARANGUS, (Girard, Gill.)

C. hippos.

Horse Crevalle', or Southern Caranx.

Form elliptical, much compressed; length of the head to the total length as two to nine; scales small, extending over the gill-covers, and high up on the base of the vertical fins: the lateral line is furnished on its straight portion with twenty-five bony plates, commencing small at first, but becoming more elevated, ending in sharp three-sided spines. In front of the first dorsal fin, which is received in a furrow, is a short spine, directed forwards, and nearly concealed in the skin. Caudal fin deeply forked. The back is bluish; golden yellow on the sides; ventrals, anal and caudal fine yellow, the latter with dusky tips; chin satin-white; a dark round spot on the front margin of the opercle; another on the inner base of the pectoral, and occasionally a short black vertical bar across the middle of the pectoral fin. Total length, 12—16 inches.

Fin-rays:—D. 8, 1, 23; P. 18—20; V. 1, 5; A. 2, 17; C. 17.

Scomber hippos, L. Lyst. Nat. I, p. 494.

C. defensor, DeKay, New York Fauna, Fishes, p. 120, pl. 24, fig. 72.

Enters Chesapeake Bay, but is very rarely brought to the Baltimore markets.

Acad. Coll.

TRACHYNOTUS, (Lacep.) Cuv. & Val.

1—T. carolinus.

Pompano, Crevalle'.

Similar in shape to the preceding. The first dorsal fin is repesented by six short spines, each with a short membrane and preceded by a spine directed forward ; the second dorsal and the anal fin with their first rays prolonged. The face abruptly cut off before the eyes.

The color of this fish is beautiful silvery, a little darker upon the back. When dead, it is golden, shaded with pale blue along the back. Total length, 20 inches.

Fin-rays :—D. 6, 1, 24; P. 16—18 ; V. 1, 5 ; A. 2.20 ; C. 18—20.

Lichia carolina, DeKay, l. c. p. 114, pl. 10, fig. 30.

Bothrolæmus pampanus, Holbr. Ichth. S. Car. p. 83, pl. 11, fig. 2.

Doliodon carolinus, Girard, Proc. Acad. Nat. Sc. Philad. 1858, p. 168.

Trachynotus carolinus, Gill, Proc. Acad. Nat. Sc. Philad.

Rather uncommon in Chesapeake Bay, but is occasionally brought to the Baltimore markets. It feeds on various kinds of molluscous and crustaceous animals. It is considered the most delicious fish of the coast.

Acad. Coll. S. I.

2—T. ovatus.

Short Pompano.

Body very much compressed, almost circular, scaleless.—The lateral line moderately upcurved, and thence straight to the tail, not concurrent with the outline of the back. Facial outline broadly concave; head projecting forward, with a blunt snout. Eyes large; teeth scarcely perceptible. Pectorals acuminate; caudal deeply forked; seven free spines before the dorsal and three before the anal. Dusky greenish above, silvery white on the belly, with clouds along the sides, and metallic reflections beneath. Length, 2 to 3 inches.

Fin-rays:—D. 7, 19; P. 19; V. 1, 5; A. 3, 19; C. 18.

Gasterosteus ovatus, L. Syst. Nat. I, p. 490.

Centronotus ovalis, Lacep III, p. 309, 316.

Tracliynotus spinosus. DeKay, New York Fauna, Fishes, p. 117, pl. 19, fig. 53, (bad.)

Lichia spinosa, Baird, Ninth Smithson. Rep. p. 336.

Doliodon spinosus, Girard, Proc. Acad. Nat. Sc. Philad., 1858, p. 168.

This species belongs to those *Carangidæ*, which inhabit the seas of both hemispheres. It is found on the Atlantic coast of tropical and temperate America, crossing the ocean to the west coast of Africa, Indian ocean and Archipelago to the coast of Australia. In Maryland it inhabits many parts of Chesapeake Bay, and in the Academy are specimens from the Potomac River near Matthias' Point, and St. Mary's River.

XXVII—STROMATEIDÆ.

POROXOTUS, Gill.

P. triacanthus.

Short-finned Harvest-fish, or Three-spined Peprilus.

Body elliptical, much compressed: its height nearly one-half of its length. Scales small. The lateral line is scaly, and nearly concurrent with the back; besides this there is a counterpart of the lateral line, but curved in an opposite direction, and between this and the true lateral line is a third line; both are without scales. Brilliant metallic green, blue and golden. Deep blue on the back, and obscurely mottled in living specimens. Length, 7 to 9 inches.

Fin-rays:—D. 3.45; P. 19; A. 3.42; C. 19.

P. triacanthus, Peck, Mem. Amer. Acad. II. pt. 2, p. 48, pl. 2, fig. 2.

— *cryptosus*, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 365, pl. 1, fig. 3.

Peprilus triacanthus, Storer, Rep. Massach. p. 60.

Rhombus triacanthus, DeKay, New York Fauna, Fish., p. 137, pl. 26, fig. 80.

Occurs in Sinepuxent Bay, and many parts of Chesapeake Bay, as far north as the Patapsco River.

PEPRILUS, Cuv.

P. gardenii.

Long-Finned Harvest-fish.

Oval; head and body much compressed; snout blunt; eyes large. Scales small, and little apparent, scarcely discernible on the fins, and wanting on the head and gill-covers. The rays of the dorsal fin increase rapidly in length from the fourth to the ninth, and rapidly decrease again to the eighteenth, after which they are short and equal; pectorals long and pointed; the anal is similar to the dorsal; the caudal is deeply forked. Silvery, with tints of blue and green; dusky on the head; blackish patches on the belly towards the tail, which appear red and purple in certain lights. Length, 7 inches.

Fin-rays:—D. 3. 44; P. 23; A. 4. 43; C. 19.

Chætodon alepidotus, L. Syst. I, p. 460.

Sternoptyx gardenii, Bl. Schn. p. 494.

Stromateus longipinnis, Mitch. Trans. Lit. & Phil. Soc New York, I, p. 366.

Rhombus longipinnis, Cuv. & Val., IX, p. 401, pl. 274; DeKay, New York Fauna, Fishes, p. 136, pl. 75, fig. 239.

Peprilus longipinnis, Cuv. Regne Anim. Ill. Poiss. pl. 63, fig. 2.

Stromateus gardenii, Guenth. II, p. 399.

Occurs in Sinepuxent Bay and in the southern part of Chesapeake Bay.

Acad. Coll.

XXVIII—SCIÆNIDÆ.

CYNOSCION, Gill.

C. regalis.

Salt-Water Trout, The Weak-Fish.

Body elongated, slightly elevated, rather compressed, and thicker above than below. Head broad behind, narrow at the snout, and slightly arched over the eyes. Pale brown above, with a strong greenish and purple tint, and marked with irregular dusky blotches; belly silvery; ventral and anal fins yellowish. Total length, 16 to 20 inches.

Fin-rays—D. 9. 1. 29; P. 16; V. 1. 5; A. 1. 13; C. 17.

Labrus squeteague, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 396, pl. 2, fig. 6.

Johnius regalis, Holbr. Ichth. S. Car., p. 127, pl. 18, fig. 1.

Otolithus regalis, Cuv. & Val. V, p 67; DeKay, New York Faun. Fish., p. 71, pl. 8, fig. 24; Baird, Ninth Smithson. Report, p. 329; Guenther, II, p. 307.

Sold in considerable numbers in the Baltimore markets, and is brought from the parts of Chesapeake Bay near the Ocean.

Acad. Coll. S. I.

POGONIAS, Cuv.

P. chromis.

Big Drum, or Drum-Fish.

This large fish is oblong, compressed, nearly straight on the belly, thin and much arched on the back. The head is large, slightly prominent between the eyes, and swollen at the sides. There are numerous white barbels at the chin and lower jaw. The dorsal fin is deeply emarginated, and but slightly elevated. Dull silvery, or lead colored, often with a coppery tint; a dusky blotch at the base of the pectoral fin. Total length, 3 to 4 feet.

Fin-rays—D. 10. 1. 22; P. 18; V. 1. 5. A. 2. 7; C. 17.

P. chromis, Cuv, & Val., V, p. 206.

Labrus chromis. L. Syst. Nat. p. 479.

Sciæna chromis, Bl. Schn. p. 82.

Pogonathus courbina, Lacep. V, p. 121, *Sciæna gigas*, Mitch, Trans. Lit. & Phil. Soc. New York, I, p. 412, pl. 5, fig. 10.

—*fusca*, Mitch. l. c. p. 409.

Pogonias chromis, DeKay, New York Fauna, Fishes, p. 80; Holbr. Ichth. S. Car. p. 114, pl. 16, fig. 2.

Common in the ocean drains and in the oyster regions of the Eastern Shore.

Its flesh is much esteemed, and its roe is a great delicacy; considerable numbers are brought to the Baltimore markets in the Autumn and Spring.

In the spawning season it enters the different bays and inlets of salt-water to deposit its spawn, and then begins its drumming noise. This is made in the air bladder itself; the vibrations are produced by the air being forced by strong muscular contractions through a narrow opening, from one large cavity, that of the air-bladder, to another, that of the cavity of the lateral horn; and if the hands be placed on the sides of the animal, vibrations will be felt in the lateral horn, corresponding with each sound.

Acad. Coll. S. I.

LIOSTOMUS, Lac.

1—L. xanthurus.

Yellow Tail.

Long oval, compressed; head of moderate size, covered with scales as far as the lips, which are exceedingly thin. There are two dorsal fins, contiguous, and considerably elevated; the caudal is full, entire, with minute scales on its membrane. Head and body above the lateral line pale golden-brown; cheeks, opercle and body below that line silvery. Caudal fin yellow. Total length, 10 inches.

Fin-rays:—D. 11. 1. 32; P. 21; V. 1. 5; A. 2. 13: C. 17.

Liostomus xanthurus, Lacep IV. p. 439, pl. 10. fig. 1; DeKay, New York Fauna, Fish. p. 70.

Common in the lower Potomac, in the southern part of Chesapeake Bay, and in Sinepuxent Bay.

In Worcester county it is called "White Perch."

It has habits similar to the *Liostomus obliquus*, and is taken with the same kind of bait.

Acad. Coll.

2—L. obliquus.

Croaker, or Spot.

Similar in shape to the preceding, but much more arched above, and nearly straight below. The head is large, compressed at the sides, full, rounded above and in front, and covered with scales. There are two dorsal fins, though connected by a membrane slightly elevated. Body above lightest silver-gray, with a golden tint: fourteen or more dusky bars descend obliquely on the sides from the margin of the back, and disappear below the lateral line a roundish spot above the pectoral fins; sides and belly yellowish. Length, 6 to 8 inches.

Fin-rays:—D. 10. 1. 30; P. 18; V. 1, 5; A, 2, 12; C. 18.

Mugil obliquus, Mitch, Trans. Lit. & Phil. Soc. New York, I p. 405.

Sciæna multifasciata, Lesueur, Mem. Aca. Nat. Sc. Philad. II p. 225.

Leiostomus humeralis, Cuv. & Val. I p. 141, pl. 110.

— *obliquus*, DeKay, New York Fauna, Fish., p. 69, pl. 60, fig. 195; Holbr. Ichth. S. Car. p. 160, pl. 23 fig. 1.

Sciæna obliqua, Guenther, II p. 288.

The Croaker or Spot is common in many of the brackish and salt waters of the estuaries of Chesapeake Bay. In the vicinity of Norfolk and on the southern part of the Eastern Shore it is esteemed as the choicest of the indigenous fish. Near Baltimore, in the Patapsco River, it lives in holes, and feeds on the small crustacea which abound there.

Acad. Coll. S. I.

SCIÆNOPS, Gill.

S. ocellatus.

Sea-Bass, or The Banded Corvina, or Beardless Drum.

Elongated, nearly round, slightly arched above, straight below, thicker along the back, and thinner at the belly.—Head large, flattened above; snout rounded, full, with a dependent fold of skin, partially divided into four lobes. Silvery white, with a bluish tint along the back. and an oval black spot (sometimes with two spots) bordered with white, near the upper margin of the base of the caudal fin. Attains a length of 4 feet.

Fin-rays:—D. 10. 1. 25; P. 17; V. 1. 5; A. 2. 7; C. 17.

Perca ocellata, L. Syst. Nat. p. 483.

Sciœna imberbis, Mitch. Trans. Lit. & Phil. Soc. New York, I p. 411.

Corvina ocellata, Cuv. & Val. V p. 134, pl. 108; DeKay, New York Fauna, Fish. p. 75, pl. 21 fig. 61; Holbr. Ichthyol. S. Car. p. 150, pl. 21 fig. 2.

Sciœna ocellata, Guenther, II p. 289.

Brought in the autumn and winter to the Baltimore markets, and highly esteemed for the table. It inhabits the salt waters of the southern part of Chesapeake Bay and coast of Worcester county, feeding on fish, shrimps, etc.

ACAD. COLL. S. I.

MENTICIRRHUS, (Linn.) Gill.

M. alburnus.

Carolina Whiting, or King-Fish.

Elongated, with the back slightly arched and the belly nearly straight. The prominent head is large; thick above; the snout full rounded, prolonged beyond the upper jaw, with a broad and fleshy fold on its inferior margin, thick, entire and adherent above, thin and divided into four movable lobes below. Eyes large. Mouth inferior, of moderate size, with a very protractile upper jaw, and armed with several series of small, card-like, conical, sharp teeth. A short, stout conical barbel on the chin. Silvery, a little clouded on the back, and marked with several oblique, irregular dusky bars, which run from the back to below the lateral line, where they disappear, leaving the belly silvery-white. Length, 12 to 16 inches.

Fin-rays:—D. 10, 1, 26; P. 20; V. 1, 5; A. 1, 8; C. 18.

Umbrina americanus, Catesby Hist. Nat. Car. II, p. 12; pl. 12; fig. 2.

Perca alburnus, L. Syst. Nat. p. 482; Bl. Schn. p. 87.

Sciœna alburnus, Gronov. Syst. ed. Gray, p. 51.

Umbrina alburnus, Holbr. Ichth. S. Car. p. 137; pl. 20, fig. 1; Guenther, II, p. 275.

Inhabits the salter waters of Chesapeake Bay and its estuaries.

ACAD. COLL.

MICROPOGON, Cuv. & Val.

M. undulatus.

The Croaker.

Similar in shape to the preceding; head long, elevated behind; with a full and rounded snout, and minute barbels at the chin. Body silvery, slightly shaded above, and marked with numerous minute, dusky spots, generally disposed without order, though rarely confluent, representing interrupted lines; these spots disappear below the plane of the pectoral fins, and leave the belly white. Total length, 12 to 14 inches.

Fin-rays:—D. 10.1.27; P. 14; V. 1.5; A. 2.8; C. 17.

M. undulatus, Guenther II. p. 271; Catesby, Carol. II, p. 3, tab. 3, fig. 1.

Perca undulata, L. Syst. Nat. p. 483.

Sciæna croker, Lacep. IV, pp. 309, 314, 316.

Micropogon undulatus, Cuv. & Val. V, p. 219; DeKay, New York Fauna, Fish, p. 84; Holbr. Ichth. S. Car., p. 146, pl. 21, fig. 1.

Brought to the Baltimore markets from the southern part of Chesapeake Bay. It occurs in Sinepuxent Bay, and is much valued for food. In South Carolina they call it "The Croaker."

Acad. Coll. S. I.

LARIMUS, Cuv. & Val.

L. fasciatus.

Banded Drum.

This fish is very similar to *Pogonias chromis*, as well in form, as in its individual parts. The ground color of the whole animal is silvery, more or less shaded along the head and back above; the sides are marked with several vertical dusky bars, more or less distinct; the belly is white. Total length, 2 to 2½ feet.

Fin-rays:—D. 10.1.22; P. 17; V. 1.5; A. 2.7; C. 17.

L. fasciatus, Lacep III, p. 137; Cuv. & Val. V. p. 210, pl. 118; DeKay, New York Fauna, Fish, p. 81, pl. 14, fig. 40; Holbr. Ichth. S. Car. p. 118, pl. 16, fig. 1.

Labrus grunniens, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 405, pl. 3, fig. 3.

It is quite numerous in the bays along the ocean coast, and an excellent article of food. It feeds, like *Pogonias chromis*, on molluscous and crustaceous animals.

ACAD. COLL.

XXIX—SPARIDÆ.

ARCHOSARGUS, Gill.

A. probatocephalus. (Waldb.) Gill.

The Sheepshead.

Nearly oval in form, compressed, thicker and nearly straight at the belly; thinner and greatly arched along the back, with its greatest elevation opposite the sixth dorsal spine. The head is large, compressed, elevated, full between the prominent orbits, and with a narrow, rounded snout. The head is dusky above, often with a bronzed or greenish tint; body silver-grey above, shining silvery-white on the sides, and marked with seven transverse, bluish-black bars. Total length, two feet.

Fin-rays:—D. 12.12; P. 16; V. 1.5; A. 3.11; C. 17.

Sparus ovis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 392, pl. 2, fig. 5.

Sargus ovis, Cuv. & Val. VI, p. 53; Storer, Report, p. 36; DeKay, New York Fauna, Fish, p. 89, pl. 8, fig. 23; Holbr. Ichth. S. Car. p. 54, pl. 8, fig. 2; Guenther, I, p. 447.

Frequents the oyster localities of all parts of Chesapeake Bay, but is now more common along our south-eastern counties, where it goes in small numbers to feed on the animals of the oyster bars; for the same reason wrecks of old vessels, on which barnacles and shells abound, are favorite resorts.

The fishermen of the lower part of the Eastern Shore go out in boats at night, and by the light of a pine knot or torch, strike them with a gaff, as they remain quietly balanced near the bars. In this way a single fisherman will sometimes capture as many as twenty in a single trip, and the specimens of which will weigh from 10 to 25 pounds. P. R. U.

ACAD. COLL. S. I.

LAGODON, Holbr.

L. rhomboides.

Rhomboidal Porgy.

Nearly oval in shape, compressed. The head is small, uncovered, with scales in front of the eyes. Head above pale brown, with small golden spots; lips white; sides of head marked with several alternate pale blue and golden lines; the body above the lateral line marked with similar lines of the same color, but more clouded, slightly arched and concentric. Below the lateral line these are horizontal, and parallel to the belly, where the blue lines disappear, and are replaced with alternate white and golden lines; belly white; a dusky spot above the root of the pectoral fin. Before the twelve erect spines of the single dorsal fin is a small recumbent spine. Total length, 10 inches.

Fin-rays:—D. 1. 12. 11; P. 14; V. 1. 5; A. 3. 11; C. 17.

Sparus rhomboides, L. Syst. Nat. I. p. 427.

Sargus rhomboides, Cuv. & Val. VI. p. 68. pl. 143. cop. by DeKay, New York Faun, Fish. p. 93. pl. 71. fig. 228.

Lagodon rhomboides, Holbr. Ichth. S. Car. p. 59. pl. 8. fig. 1.

Sargus rhomboides, Guenther I. p. 447.

It enters the drains of our Ocean-coast, and is occasionally caught in the lower part of Chesapeake Bay, where it feeds on the crustaceous animals and smaller fish.

Acad. Coll.

STENOTOMUS, Gill.

S. argyrops.

Big Porgy, The Fair Maid.

Form without the tail nearly oval; much compressed; arched above; thin in front of the dorsal fin; thicker and nearly straight at the belly. Head short, much elevated; eyes large; color silvery below, iridescent, and often with a greenish or bluish tint above. The single dorsal fin, placed in a groove of scales, is preceded by a short recumbent spine; the pectoral is narrow and long. Total length, 14 inches.

Fin-rays:—D. 1. 13. 12; P. 16; V. 1. 5; A. 3. 12; C. 17.

Sparus argyrops, Linn. Syst. Nat. p. 471.

— *xanthurus*, Lacep. IV. p. 129.

Labrus versicolor, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 404. pl. 3. fig. 7; Agassiz in Spix. Pisc. Brasil. p. 117, tab. 64; DeKay, New York Fauna, Fish, p, 95, pl, 9. fig. 25; Baird, Ninth Smithson. Report, p. 333; Holbr. Ichth. S. Car. p. 175. pl. 25. fig. 1.

Pagrus argyrops, Guenther, I. p. 472.

Sargus umbrosus, Guenther, I.

It is a good fish, and is brought to the Baltimore markets in small numbers, from the southern part of Chesapeake Bay.

Acad. Coll. S. I.

XXX—PRISTIPOMATIDÆ.

HÆMULON, Cuv.

1—H. formosum.

Squirrel Fish.

The body is nearly oval, compressed; the back arched; snout produced. The scales are large; largest on the sides of the body, smaller beneath and on the head, extending to the very tips of the pectoral, dorsal and caudal fins. Bluish stripes (10 to 12) on the cheeks, bordered with brown, on a more or less gilded ground; remainder of the body golden grey, without lines. The dorsal fin with its twelve spinous rays, is exceedingly robust and acute, and received into a sheath. Length, 12 inches.

Fin-rays:—D. 12. 15; P. 1. 16; V. 1. 5: A. 3. 9: C. 17.

H. formosum (Guenther I, p. 305)

Perca formosa, L. Syst. Nat. I. p. 488.

Labrus plumieri, Lacep. III, p. 480, pl. 2, fig. 2.

Hæmulon formosum, Cuv. & Val. V. p. 230; DeKay, New York Fauna, Fishes, p. 86, pl. 20, fig. 59.

Also lives in the salt-waters not remote from the Ocean, mouth of the Potomac River, &c.

Acad. Coll.

2—H. chrysopteron.

Yellow-finned Red-mouth.

In general shape like the Big Porgy. The body is elongated, much compressed, sharp and arched along the back, broader and nearly straight below. The very large head is long, compressed at the sides, narrower below, broad and flat between the eyes. When first taken from the waters, the whole animal is bright silvery, but it soon becomes of a pale burnt umber-brown, though the belly remains white. The posterior two-thirds of the lower jaw and mouth within and without are red. Total length, 12 inches.

Fin-rays:—D. 13. 14; P. 15—17; V. 1. 5; A. 3. 10; C. 18.

H. chrysopteron, Guenther, I, p. 313.

Perca chrysoptera, Linn. Syst. Nat. I, p. 488.

Lutjanus chrysopterus, Lacep. IV, pp. 186, 226.

Hæmulon chrysopteron, Cuv. & Val., V, p. 240, DeKay. New York Zool., IV, p. 85, pl. 7, fig. 22; Holbr. Ichth. S. Car., p. 121, pl. 17, fig. 1.

Occurs occasionally in the lower part of the Chesapeake Bay. It is not esteemed as food, its flesh lacking both firmness and flavor.

ORTHOPRISTIS, Girard.

O. fulvomaculatus.

Hog Fish; The Speckled Red-mouth, or Grunts.

The form of this fish is elongated, compressed, thin and much arched at the back, thicker and nearly straight at the belly. The head is large, with a long and straight face, or but slightly incurved above the eye. Above pale brown: belly silvery; sides marked with numerous yellow spots, disposed in irregular oblique lines above the lateral line, and below it in horizontal rows. Lower jaw orange at the angle of the mouth. Total length, 10 to 11 inches.

Fin-rays:—D. 11. 15; P. 18; V. 1. 5; A. 3. 12; C. 17.

Labrus fulvo-maculatum, Mitch. Trans. Phil. Soc. New York, I, p. 406.

Hæmulon fulvo-macrlatum, DeKay, New York Fauna, Fish, p. 84, pl. 7, fig. 2; Holbr. Ichthyol. S. Car. p. 157, pl. 22, fig. 2.

Pristipoma fulvo-maculatum, Guenther, I, p. 301.

Occurs in the salt water of the lower part of Chesapeake Bay, and is much esteemed for food.

ACAD. COLL. S. I.

XXXI—SERRANIDÆ.

CENTROPRISTIS, Cuv.

C. atrarius.

Black Will, Black Fish, Black Perch, or Sea Bass.

The form is somewhat oblong, but when its capacious mouth and large gill-openings are extended, it appears nearly triangular. The very large head is more or less elevated, but descends rapidly towards the tail. Scales large. Very variable in color, but generally dusky-brown. Each scale has a dusky margin with a transparent spot in the middle, that allows the black skin to be seen under it. Length, 6 to 12 inches.

Fin-rays:—D. 10. 11; P. 18; V. 1. 5; A. 3. 7; C. 17.

C. atrarius, Guenther I, p. 86.

Perca atraria, L. Syst. Nat. I, p. 485.

Coryphœna nigrescens, Bl. Schn., p. 297.

Perca varia, Mitchill Report, p. 10.

Lutjanus trilobus, Lacep, IV, p. 246.

Centropristis nigricans, Cuv. & Val., III, p. 37, pl. 44; DeKay, New York Fauna, Fish, p. 24, pl. 2, fig. 6.

— *rufus*, Cuv. & Val., IV, p. 47.

— *atrarius*, Holbr. Ichth. S. Car., p. 45, pl. 7, fig. 2.

This is a well known fish to the market people, and is sometimes brought in considerable numbers during the Spring and Autumn. It never reaches a very large size, not exceeding 15 inches. It is very voracious, feeding alike on dead or living animal substances, and is in consequence easily taken with the hook.

It abounds on the coast of Worcester county, and in Sinepuxent Bay.

Acad. Coll S. I.

XXXII—LABRACIDÆ.

ROCCUS, Gill.

R. lineatus.

Striped Bass, or Rock-Fish.

The body is cylindrical, tapering, and moderately compressed. The head is large, long, thick, and very broad between the eyes; the snout very full and obliquely rounded. Bluish-brown or bluish above, silvery on the sides and beneath. Along each side are from seven to nine longitudinal lines of bluish-black color, which are occasionally indistinct or interrupted. Total length, 18 to 24 inches, and sometimes even much greater.

Fin-rays:—D. 9. 2. 12; P. 15—16; V. 1. 5; A. 3. 11; C. 17.

R. lineatus, Gill, Proc. Acad. Nat. Sc. Philad. 1860, p. 112.

Perca saxatilis, Bl. Schn. p. 89.

P. septentrionalis, Bl. Schn. p. 90, Taf. 20.

Sciæna lineata, Bl., Taf. 304.

Centropomus lineatus, Lacep. IV. 255.

Roccus striatus, Mitch. Report p. 25.

Perca mitchilli, Mitchill, Trans. New York, 1 p. 413, pl. 3 fig 4.

Labrax lineatus, Cuv. & Val. II p. 79; DeKay, New York Fauna, Fish., p. 7, pl. 1 fig. 3; Baird in Ninth Smithson. Report, p. 321; Holbr. Ichth. S. Car. p. 24, pl. 4, fig. 1.

This fish may occasionally be found in small shoals feeding on the barnacles and small crustacea around the piles of bridges and beneath scows and boats. They seem to prefer deep holes and basins in the channels of estuaries, in salt or brackish water. Many Rock-fish winter in the salt creeks, but the majority seek the deep sea-water.

In the late winter and early spring large specimens full of spawn are common in the Baltimore markets. The large specimens of this fish are known by the name of "Rollers."

ACAD. COLL. S. I.

MORONE, Gill.

M. americana.

The White Perch.

Body oval, much compressed; arched and thin along the back, less arched and slightly thicker at the belly. Head rather long, but not much elevated; eyes very large. Light bluish above, and paler beneath; sides and abdomen white; and without spots or marks, when just drawn from the water. Total length, 10 to 12 inches.

Fin-rays:—D. 9. 1. 12; P. 14; V. 1. 5; A. 3. 9; C. 17.

Morone americana, Gill, Proc. Acad. Nat. Sc. Philad.

Perca americana, Gmel., Syst. Vol. 1, p. 1308.

Morone rufa, Mitchill, Report, p. 18.

Labrax mucronatus, Cuv. & Val. II p. 86, pl. 12; Baird in Ninth Smithson. Report p. 322.

— *rufus*, DeKay, New York Fauna, Fishes, p. 9, pl. 3 fig. 7; Guenther, I p. 65.

— *americanus*, Holbr. Ichth. S. Car. p. 21, pl. 3, fig. 2.

— *pallidus*, DeKay, l. c. p. 11, pl. 1, fig. 2.

The dark variety of this fish is called "Black Perch" on the western shore of Maryland. It inhabits the rivers and estuaries of the Chesapeake Bay in brackish waters, and sometimes swarms in such localities as the Potomac, south of Alexandria. It is much esteemed by the citizens of Baltimore, and is a favorite with certain anglers, who do not particularly value fly-fishing.

Acad. Col. S. I.

XXXIII—PERCIDÆ.

PERCA, Artedi.

P. flavescent.

American Yellow Perch.

Body elongated, moderately compressed, with the upper outline arched, and the lower nearly straight. The large head is flattened and the snout full and rounded. The eye is very large, more or less dusky above, tinted with greenish-yellow; sides, golden yellow; belly paler; chin flesh-colored. Six or eight vertical dusky bands, descending from the back on the sides disappear on the belly. Ventrals and anals bright orange; pectorals yellowish orange. Dorsals and caudal dusky brown. Total length, from 10 to 12 inches.

Fin-rays:—D. 13. 1. 13; P. 15; V. 1. 5; A. 2. 8; C. 17.

P. flavescens Guenther I p. 59.

Bodianus flavescens, Mitch, Ph. Trans. New York, I p. 421.

Perca flavescens, Cuv. & Val. II p. 46; Richardson. Fauna Bor. Amer., Fishes, p. 1, pl. 74; Storer, Report, p. 5, and Synopsis, p. 17, and Boston Journal Nat. Hist. IV, p. 175; DeKay, New York Fauna, Fish, p. 3, pl. 1 fig. 1; Holbr., Ichth. S. Car. p. 2 pl. 1, fig. 1.

— *granulata*, Cuv. & Val. II p. 48, pl. 9, cop. by DeKay, New York Fauna, Fish, p. 5, pl. 68, fig. 220.

— *serrato-granulata*, Cuv. & Val. II p. 47; DeKay, l. c., pl. 22, fig. 64.

The "American Yellow Perch" or Common Perch" is solitary in its habits, and even when very abundant is never seen in shoals. During the cold weather it is an inhabitant of the deep water, but in the summer it swims slowly against the current; it often stops very suddenly for a short time, in an almost perpendicular position, searching for food, and as suddenly darts forwards rapidly for a short distance, to repeat the same manœuvre. Notwithstanding its teeth are small, it is very voracious, and during July and August swims near the surface to catch insects. In November it is taken with rod and line south of the city of Baltimore. Having a white, firm and delicate flesh, it is brought in vast numbers to the city in spring and autumn, and commands a ready sale.

In the Chester, Patapsco and other rivers not remote from Baltimore, specimens of unusual size have occasionally been taken, weighing more than four pounds.

Acad. Coll.

STIZOSTEDIUM.

S. americana.

Yellow Pike-Perch, or Jack.

Body elongated, cylindrical, tapering; profile of head in a gently sloping straight line to the end of the snout. Mouth wide, extensive; the lower jaw received into the upper. Yellowish-olive above the lateral line; lighter on the sides; silvery beneath. Head and gill-covers mottled with green, brownish and white. Length, 12 to 18 inches.

Fin-rays:—D. 13. 1. 21; P. 15; V. 1. 5; A. 1. 14; C. 17.

Lucioperca americana, Valenciennes, I. p. 122, pl. 16: Kirtland, Zool. Ohio, p. 19, and Bost. Journ., IV. p. 237, pl. 9, fig. 2; Rich. Faun. Bor. Amer., Fishes, pp. 10 and 14: DeKay, New York Fauna, Fish., p. 17, pl. 50, fig. 163: Agas. Lake Super., p. 294.

Stizostedium americanum, Cope. Atlas of Md.

Scarcely if at all brought to the Baltimore markets, although it attains to a large size, and is highly prized for food in the mountainous regions, where it occurs. It is said to prefer the clear, cool, rapid waters of the higher levels.

MICROPTERUS, Gill.

M. salmoides.

The Black Bass.

Elongated oval, arched; thick and rounded along the back; thinner and nearly straight at the belly. Head very large and thick, especially between the eyes; snout full and rounded; eyes very large. Head and body dusky above, with a greenish or bronzed tint; lower jaw and belly white; along the flanks runs a dusky band, more or less distinct according to the age of the fish; a bluish-black spot on the point of the opercle. Total length, 14 inches, but occasionally 24 inches.

Fin-rays:—D. 9. 14; P. 14; V. 1. 5; A. 3. 12; C. 19.

M. salmoides, Gill, Proc. Amer. Assoc. 1873, p. 67.

Labrus salmoides, Lacep. IV. pp. 716, 717, pl. 5, fig. 2.

Grystes salmoides, DeKay, New York Fauna, Fishes, p. 26, pl. 69, fig. 223.

Introduced into the Potomac River from the Youghioghany; and now abounds in some of the upper parts of that stream, likewise in the Chesapeake and Ohio Canal, and has become naturalized in Lake Roland, near Baltimore.

It is greatly esteemed by the inhabitants of Montgomery, Frederick and Washington counties, who travel many miles to obtain a supply of it.

Acad. Coll. S. I.

HYPERISTIUS.

H. hexacanthus.

Goggle-Eye, or Goggle-Eye Perch.

Nearly oval, much compressed, arched, thin both at the back and belly, the thickest part being just above the lateral line. The long, thin and elevated head is incurved above the eyes, and the snout is rounded, though narrow. The eye is very large. Head and body above more or less dusky, shaded with bluish-green; lower jaw, sides and belly silvery, marked with bluish-green blotches, more or less distinct, and placed without much regularity. The dorsal, anal and caudal fins with numerous yellowish spots. Total length, 8 to 12 inches.

Fin-rays:—D. 7. 15; P. 12; V. 1. 5; A. 6. 17; C. 17.

Centrarchus hexacanthus, Guenther, I. p. 257.

— *sparoides*, Cuv. & Val., III. p. 88, pl. 48.

— *hexacanthus*, Cuv. & Val., VII. p. 458; Kirtland, Bost. Journ., III. p. 480, pl. 29, fig. 2.

Cichla storeria, Kirtl. Rep. Zool. Ohio, p. 191.

Pomoxis hexacanthus, Holbr. Ichth. S. Car., p. 39, pl. 6. fig. 1.

Its precise locality in the State is uncertain, but probably in some of the streams emptying into the lower Potomac. Its food is said to be insects and small crustacea. Said to occur near the mouth of the Chester River, and sold in the Baltimore markets as "Strawberry Perch."

Acad. Coll. S. I.

ENNEACENTRUS, Gill.

E. gloriosus.

Sun-Fish.

Form oval, moderately compressed, the head somewhat scooped out above the eye, the muzzle rather short and blunt, the second-dorsal and the anal fins broad and rounded, the tail abruptly narrowed, slender; length of the head about one-third of that of the body including the tail-fin; the greatest height of body is about equal to one and a-half of the head. Colors brilliant, olive-greenish above, paler beneath, flecked, particularly above with bright gold-color, fins rosy, or even carmine, sometimes a little dusky, but marked all over with golden spots; often with a black spot on the back part of the gill-cover, placed a little above the tip, and with a small black spot next the base of the tail-fin. Length 2-2¾ inches.

Fin-rays:—D. 9. 11; P. 14; V. 1. 5; A. 3. 10; C. 17.

Bryttus gloriosus, Holbr., Journ. Acad. Nat. Sc. Philad. 1855, p. 51, pl. 5, fig. 4.

The most beautiful of all our Sun-Fish. It is too small to serve as an article of food for man, but it is mercilessly seized by the voracious pike.

Inhabits some of the clear streams emptying into the lower Potomac, and abounds in spring-water coves, where the Myriophyllum grows rankly.

Its rosy fins, flecked with gold, cause it to be greatly admired.

Acad. Coll.

POMOTIS.

P. aureus.

Common Pond-Fish, or Freshwater Sun-Fish.

Body oval, compressed, convex above and below, but straighter and thicker at the belly. Head large, broad, smooth between the eyes and snout, which is full and rounded. Eyes large; mouth rather small, and very protractile. Head dusky above, with pale-blue waving lines running from the snout to the eye; sides of face also marked with five or six bands of similar color; appendix black, with a bright scarlet blotch behind. Body olive-brown above, marked with irregular reddish-brown spots; sides and belly yellow, more or less clouded, and with numerous brazen spots below the lateral line. Fins more or less tinged with yellowish-brown.—Length, 6 to 8 inches.

Fin-rays:—D. 10. 11; P. 13; V. 1. 5; A. 3. 10; C. 17.

L. aureus, Mitchill.

Pomotis vulgaris, Cuv. & Val. III, p. 91, pl. 49; Richards, Faun. Bor. Amer. p. 24, pl. 76; Kirtland in Bost. Journ. III, p. 470, pl. 28, fig. 2; DeKay, New York Fauna, Fish., p. 31, pl. 51, fig. 166; Holbr. Ichth. S. Car. p. 8, pl. 1, fig. 2.

Lepomis aureus, Cope. Atlas of Md. Zool.

In the region adjacent to Baltimore they prefer the brackish water, and are not found in the lower part of Chesapeake Bay.

It is considered by many a very sweet fish.

It prepares a place for depositing its spawn, usually in the high Eel-grass, or among the *Potamogetons*, where the bottom is sandy or of clay, sweeping it with the tail and excavating a shallow basin of from 1 to 2 feet in diameter, often selecting a spot, from which a small stick projects, to which it attaches its eggs. The mother-fish guards the eggs with great assiduity, defending them from all intruders, and remaining near until they are hatched.

ACAD. COLL. S. I.

LEPOMIS, Cope.

L. auritus.

Black-Eared Pond-Fish.

Form a little longer, oval, compressed. Of a general rusty brown, in some specimens golden brown, strongly marked above the middle of the body by ferruginous spots; these spots are more sparse and distinct below the lateral line; body beneath and in front of the ventral fins blood-red; throat bluish-white. Two bluish-white undulating lines from head to tail. The long, broad appendix, rounded behind, is of a uniform black color. Length, 5 to 7 inches.

Fin-rays:—D. 10 to 11, 9 to 11; P. 11 to 12; V. 1. 5; A. 3. 9 to 10; C. 18.

Labrus auritus, Linn.

P. appendix, Storer, Synops. p. 42.

This is the common Sun-Fish of our fresh water streams, sometimes attaining to a length of 6 inches.

It is eaten by the farmers of the interior of the State, and is always acceptable as an article of food.

Acad. Coll. S. I.

PERCINA.

P. caprodes.

Little Pickering.

Body oblong, cylindrical. Head small, sloping; eyes rather large; lower jaw shortest; gape moderate. The general color is pale greenish-olive, lighter towards the abdomen. The body is barred with black, transverse bands, extending from the back towards the sides; they are alternately longer and shorter, none are found on the lower third of the sides. A dark round spot at the base of the caudal; dorsals dark brownish; caudal fin with four or five vertical bands. Length, 2 to 4 inches.

Fin-rays:—D. 13. 15; P. 15; V. 1. 5; A. 12; C. 15.

Pileoma semifasciata, DeKay, New York Fauna, Fishes, p. 16, pl. 50, fig. 162.

— *zebra*, (*Etheostoma*), Agass. Lake Superior, p. 308, pl. 4, fig. 4.

Inhabits tributaries of the Potomac river South of Washington, and it occurs also in the Chesapeake and Ohio Canal. One specimen is in the Academy, which was caught in the Pamunkey Creek.

Acad. Coll.

BOLEOSMA, DeKay.

B. olmstedi.

Tessellated Darter.

Body cylindrical, tapering, covered with rough scales, which are moderately large for the size of the fish. Head small; nape smooth, and depressed, as if strangulated. Eyes large, contiguous. The pointed pectorals and the small ventrals close together. The caudal fin, which is a powerful instrument, is even. Olive brown, with from five to seven oblong, squarish, black spots on the back along each side of the dorsal fin. Seven to nine similar spots along the lateral line; a short, vertical, black line from the eye obliquely forward, and a similar black dash from the eye to the nose; narrow bars on the rays. Length, 2 to 3 inches.

Fin-rays:—D. 9. 14; P. 13; V. 1. 5; A. 10; C. 17.

Etheostoma olmstedi, Storer, Synopsis, p. —

Boleosoma olmstedi, Agass, Lake Sup. p. 299.

B. tessellatum, DeKay, New York Fauna, Fish, p. 20, pl. 20, fig. 57.

Estrella atromaculata, Girard, Proc. Philad. Acad. 1859, p. 65.

This beautiful and graceful little fish inhabits the stony parts of our shallower streams. It is fond of settling on the flat rocks where the water is shallow, and darts with such rapid impulse as scarcely to be traceable by the eye. Being of such small size it is not used for food, but is preyed upon by the larger carnivorous fishes, which frequent similar places.

ACAD. COLL.

XXXIV—LOBOTIDÆ.

LOBOTES, Cuv.

L. surinamensis.

Black Triple-tail, Black Perch.

Form elliptical, elevated, compressed, a little thicker on the belly than along the margin of the back. Head short and compressed; snout rounded; profile incurved. When first taken from the water, this fish is light silver-grey, but it becomes soon darker, and finally almost black above; lower jaw, and cheeks near the eyes, are tinted with yellow, and a similar tint is occasionally seen along the back and shoulders. Dorsal, anal and ventral fins slightly tinted with yellowish. Total length, 16 inches.

Fin-rays:—D. 12. 16; P. 15; V. 1. 5; A. 3. 12; C. 17.

Holocentrus surinamensis, Bl. Taf. 243.

Bodianus triurus, Mitch. Trans. Lit. & Phil. Soc. New York, I. p. 428, pl. 3. fig. 10.

Lobotes surinamensis, Cuv. & Val. V. p. 319; DeKay, New York Faun. Fish. p. 88, pl. 18, fig. 49; Holbr, Ichth. S. Car. p. 169, pl. 24, fig. 2.

Occasionally caught in the lower part of the Chesapeake Bay.

XXXV—POMATOMIDÆ.

POMATOMUS, Lac.

P. saltatrix.

Tailor, or Blue-Fish.

Oblong, compressed, thicker above, and almost sharp below. Head rather large, thick, with the line of the profile slightly convex, and the snout rounded. When first taken from the water brilliant silver-colored, which soon becomes shaded with pale green along the back, finally darkening into a greenish-blue, especially in the old fish, and hence it is called "Blue-Fish." A dusky spot at the root of the pectoral fin. Total length, 2 to 3 feet.

Fin-rays:—D. 8.27; P. 16; V. 1.5; A. 2.28; C. 20.

Gasterosteus saltatrix, L. Syst. Nat. I, p. 49.

Scomber saltator, Bl. Sch. p. 35.

Pomatomus skib, Lacep. IV, p. 436, pl. 8, fig. 3.

Scomber plumbeus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 424, pl. 4, fig. 1.

Temnodon saltator, Cuv. & Val. IX, p. 225, pl. 260; DeKay, New York Fauna, Fish, p. 130, pl. 26, fig. 81; Baird, Ninth Smithson. Report, p. 337; Holbr. Ichth. S. Car. p. 64, pl. 9, fig. 2; Guenth. II, p. 479.

Exceedingly abundant in Chesapeake Bay; isolated specimens wander up as high as to the Susquehanna River.

"They have many of the habits of the Common Mackerel; collect in great multitudes, often swimming near the surface of the water, thus causing a thousand ripples, leaping at times a foot or more into the air, whence they are called 'Skip-Jacks.' "

Small specimens are common in summer in all the tide-water streams emptying into Chesapeake Bay.

Acad. Coll. S. I.

XXXVI—ELACATIDÆ.

ELACATE, Cuv.

E. canadus.

Cobia, or Crab-Eater.

Elongated, nearly cylindrical, tapering gradually to the tail, and flattened above from the first dorsal spine to the snout, which gives it the appearance of the following fish. The large head is flat above, but full at the sides. The fresh fish is above dark olive-brown, which soon assumes a bluish-black color; cheeks and lower jaw silvery, faintly tinted with red; a broad, olive-brown band runs from the eye to the tail, and above and below this is a lighter tinted band; abdomen entirely white. All fins, except the white ventral fins, are olive-brown, and black at their bases. The soft dorsal fin is preceded by eight short, strong and compressed spines. Attains a great size, sometimes more than 4 feet long.

Fin-rays:—D. 8.2.30; P. 20; V. 1.5; A. 2.23; C. 21.

Gasterosteus canadus, L. Syst. Nat. p. 491.

Scomber niger, Bl. tab. 337.

Centronotus gardenii, Lacep. III, p. 357.

— *spinosus*, Mitch. Trans. Lit. & Phil. Soc. N. York, I, p. 490, pl. 3, fig 9.

Elacate atlantica, Cuv. & Val. VIII, p. 334, pl. 233; DeKay, New York Fauna, Fishes, p. 113, pl. 25, fig. 77.

— *canada*, Holbr. Ichth. S. Car. p. 97, pl. 14, fig. 2.

— *nigra*, Guenth. II, p. 375.

Found in the salt-water of the Southern part of Chesapeake Bay.

XXXVII—ECHENEIDIDÆ.

LEPTECHENEIS, Gill.

L. naucrates.

White-Tailed Remora.

Body cylindrical, skin granular, and covered with slime. Head nearly one-sixth of the total length; flat above, with a broad disk, which is surrounded by an elevated border, and divided throughout its length by a fleshy partition, on each side of which are from twenty-one to twenty-three pairs of transverse plates. A fresh specimen is slate-brown above, lighter beneath. A broad black band extends from the angle of the mouth to the tail. Along the back are a series of dark colored marks, like an inverted letter V. Pectorals and ventrals edged with white; dorsal and caudal with a broad, white border, gradually diminishing towards the last rays. Tip of caudal broadly edged with white. Length, 12 to 20 inches.

Fin-rays:—D. 33; P. 18; V. 7; A. 30; C. 18.

Echeneis naucrates, L. Syst. I. p. 446; Storer, Rep. Fishes, Massach. p. 153; Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 377.

— *albicauda*, Mitch. Am. Monthl. Mag. II, p. 244; DeKay, New York Fauna, Fishes, p. 307, pl. 54, fig. 177.

A solitary specimen of this ocean fish is occasionally met with in Chesapeake Bay.

Acad. Coll.

ECHENEIS, Artedi.

E. naucratoides.

The Suck-Fish.

Similar in form to the preceding. Head large, broad, concave above, where it is occupied by the oval adhesive disk, the border of which is fleshy, thick, free, movable and elevated. It is divided by a partition, on each side of which are twenty-one transverse plates, with their free margins directed backwards. The body of a fresh specimen is dark above, with belly and lower jaw white; from the tip of the latter runs a stripe along the middle to the tail, interrupted only at the eye and pectoral fin; above this is a narrow band of clouded yellow, and below a sulphur-colored one. Dorsal, anal and ventral bluish, the former with the tips of the first six or seven rays white; caudal bluish, with the upper and lower margins white. Total length, 2 feet.

Fin-rays;—D. 37; P. 18; V. 1. 5; A. 33; C. 18.

E. naucratoides, Gill.

E. holbrookii, Guenther, II p. 382.

— *albicauda*, DeKay, New York Fauna, Fishes, p. 307.

— *lineata*, Holbr. Ichth. S. Car. p. 102, pl. 14, fig. 1.

— *holbrookii*, Guenther, Ann. & Mag. Nat. Hist. May, 1860, p. 400.

Rather uncommon in Maryland waters, but is sometimes met with in the southern part of Chesapeake Bay.

ACAD. COLL.

XXXVIII—ATHERINIDÆ.

CHIROSTOMA, Sw.

C. notata.

Dotted Silverside, or Gudgeon.

Body elongated, cylindrical, compressed. Head of moderate size, somewhat flattened above, and one-fifth of the total length. Scales and eyes large; jaws very protractile. A broad silvery band from the gill covers to the tail. Color above this stripe sea-green; a dark, rounded spot at the base of the anal ray. Length, 3 to 4 inches.

Fin-rays:—D. 9. 1. 19; P. 15; V. 1. 5; A. 1. 25; C. 19.

Atherina notata, Mitch. Lit. & Phil. Trans. New York, I p. 446, pl. 4 fig. 6; DeKay, New York Fauna, Fish, p. 141, pl, 28, fig, 88; Guenther, III p. 406.

This is the common Gudgeon, which runs from Chesapeake Bay into the fresh waters of our branches. In the Patapsco river it runs in May, and then affords fine sport to the anglers.

ACAD. COLL.

XXXIX—MUGILIDÆ.

MUGIL, Artedi.

1—M. albula.

White Mullet.

Body almost cylindrical, tapering. Head moderate. Eyes covered with a thick skin. Scales on head and body large and rounded. Lips thin, finely pectinated, with membraneous slips. Of uniform white color, rather darker along the sides of the back, with a few dark-colored longitudinal stripes, which occur in many specimens. Caudal fin with a blackish border. Length, 9 inches.

Fin-rays:—D. 4. 1. 8; P. 15; V. 1. 5; A. 1, 6; C. 15.

M. albula, L. Syst. I p. 520, from Catesb. South. Carol. II pl. 6; Mitch. Lit. & Phil. Trans. New York, I p. 447; Cuv. & Val. XI p. 94; DeKay, New York Fauna, Fishes, p. 146.

Brought to the Baltimore markets from the salt-water of the southern part of Chesapeake Bay. It enters the Bay, from the ocean, but nothing is reported as to its spawning in our region.

2—M. lineatus.

Striped Mullet.

Body cylindrical; the outline of the back nearly as convex as that of the abdomen. Scales large, and easily detached. Head smaller than in most of the species; eyes large, with a thick skin. Purplish brown above; lighter on the sides, with ten or twelve dark brown longitudinal stripes, which disappear soon after death. Head with greenish metallic reflections; sides of the head yellowish. A dark purplish spot at the base of the pectoral fins; abdomen pearl-grey. Length, 6 to 9 inches.

Fin-rays:—D. 4. 8; P. 16; V. 1. 5; A. 3. 8; C. 12.

M. lineatus, (Mitch.) Cuv. & Val., XI. p. 96; DeKay, New York Faun., Fish., p. 144, pl. 15, fig. 42.

Of rare occurrence in our markets, and no doubt brought from the salt waters of Chesapeake Bay.

S. I.

XL—GASTEROSTEIDÆ.

APELTES, (DeKay,) Brev.

A. quadracus.

Four-Spined Stickle-Back.

Body fusiform, compressed, highest opposite the first dorsal spine; back arched; tail exceedingly slender. Head small. In front of the dorsal fin are three, and occasionally four movable spines, with a small membrane attached to each, all lying in a groove. Ventrals reduced to a single, stout, triangular spine, serrated on its front edge. Anal fin with a sharp, recurved spine. Olive-green, marbled with dusky above; whitish beneath. Length, 1 to 2 inches.

Fin-rays:—D. 3 or 4. 1. 12; P. 12; V. 1; A. 1. 10; C. 13.

A. quadracus, Mitch. Trans. Lit. & Phil. Soc., I. p. 430, pl. 1, fig. 11 (bad); Cuv. & Val., III. p. 504; DeKay, New York Faun., Fish. pl. 6, fig. 18.

Gasterosteus apeltes, Cuv. & Val., IV. p. 505; Storer, Report, p. 31.

This fish runs in the Patapsco River some distance beyond tide, and no doubt seeks the inlets, where it may build its nest in the matted foliage of the Myriophyllum.

Its particular range has not yet been determined.

ACAD. COLL.

XLI—BELONIDÆ.

BELONE, Cuv.

B. longirostris.

Silver Gar, Banded Gar-Fish or Sea-Snipe.

Body much elongated; covered with small, transparent, roundish scales. Head and opercles trigonal, flat above. Upper mandible flattened at its base, rounded forward, terminating in an acute tip. Both mandibles furnished with long, conic, sharp, distant teeth, with smaller ones between. Upper part of body transparent sea-green. Side of head and body bright silvery, abdomen opaque white. A narrow green band runs from the opercle to the tail, separating the color of the back from that of the sides. Length, 1 to 2 feet.

Fin-rays:—D. 16; P. 12; V. 6; A. 19; C. 19.

B. truncata, Lesueur, Journ. Acad. Nat. Sc., Philad., II. 1821, p. 126, with a plate; Storer, Report Massach. Fish, p. 98; DeKay, New York Fauna, Fish, p. 227, pl. 35, fig. 112; Cuv. & Val., XVIII. p. 422; Guenther VI. p. 244.

— *scrutator*, Girard, Proc. Ac. Nat. Sc., Philad., 1858, p. 170, and U. S. & Mex. Bound. Survey, Ichth. p. 30, pl. 13.

Esox longirostris, Mitch. Amer. Month Mag., II. 1817, p. 322.

Common in all the brackish waters of Chesapeake Bay and its vicinity. It is brought to the markets, but seems not to be very highly esteemed.

ACAD. COLL. S. I.

XLII—SCOMBERESOCIDÆ.

EXOCŒTUS, Artedi.

E. Mesogaster.

Flying Fish.

Elongated, almost cylindrical, flattened above, tapering towards the tail; head smooth, triangular. Scales thick and easily rubbed off; on each side of the body is a row of ridged ones, which extend from the lower edge of the gilt-covers to the tail. Eyes large, with a moderate depression between them, and three small pores on each side, and with channelled lines along the back. The dorsal fin commences over the ventrals; the pectorals with fifteen branched rays; the anal longer than high; the caudal deeply lunate, with its lower lobe much longer. Length, 12 inches.

Color dark greenish, or bluish, above; beneath silvery white. Length 10—12 inches.

Fin-rays;—D. 14; P. 15; V. 6; A. 8.

E. mesogaster, Mitch. Trans. Lit. & Philos. Soc. N. Y., I. p. 448, pl. 5, fig. 3.

E. noveboracensis, DeKay, New York Fauna, p. 230.

Occurs at the mouth of the Potomac River, and in the southern part of Chesapeake Bay.

ACAD. COLL.

HEMIRHAMPHUS, Cuv.

H. roberti.

Long and slender, head contained two and three-fourth times in the length af the body, excluding the tail-fin; lower jaw five and a-half times as long as the upper. Back dark greenish, sides with a well-defined silvery band. Length, 6 to 10 inches.

Fin-rays:—D. 15: P. 13: V. 6; A. 16; C. 18.

H. roberti, Cuv. & Val. XIX, p. 24; Guenther, Cat. British Museum, vol. VI, p. 263.

Obtained on the bay side of St. Mary's county in August. It swims in shoals, and seems to be common in that region.

ACAD. COLL.

SCOMBERESOX, Lacep.

S. scutellatus.

Northern Bill-Fish.

Body elongated, compressed, gradually lessening in depth back of the anus. Head, including the jaws, equal to one-fourth the length of body; gill-covers large, smooth; the lower jaw the longer. Structure of jaws as in the *Gar-Fish*. Belly with a keel-like edge. The posterior portions of the dorsal and anal fins are divided, forming finlets, as in the *Mackerel*. From the lower edge of the opercle, extending to the fourth anal finlet, forming the lateral boundaries of the abdomen, are two yellowish lines, formed by a continued series of scales. Back olive-green; beneath it a strongly-marked silvery band, half an inch wide, divided in its centre by a narrow line of the same color as the back; abdomen and gill-covers satiny. Dorsal fin and its finlets greenish; a dark green spot at base of the pecorals, above. Length, 10 to 12 inches.

Fin-rays:—D. 10. V or VI; P. 14; V. 6; A. 12. V or VI; C. 20.

S. scutellatum, Lesueur, Journ. Acad. Nat. Sc. Philad. II, 1821, p. 132.

— *scutellatus*, Cuv. & Val. XVIII, p. 477.

Met with, but only very rarely, near the entrance to Chesapeake Bay.

XLIII—ESOCIDÆ.

ESOX, (Artedi) Cuv.

1—E. umbrosus.

Body somewhat cylindrical; the outline of the back moderately straight. Head contained four times in the total length. Color more or less dull leaden, faintly, if at all, banded. Operculum and cheeks entirely covered with scales.

Fin-rays:—D. 13; V. 12; A. 12.

E. umbrosus, Kirtland, Cleveland Annals Science, 1854, p. 79; Cope. Proceed. Acad. N. S. Philad. 1865, p. 79.

The only known locality for this fish within the limits of the State of Maryland, is the Susquehanna River, on the boundary of Harford county. How far it contributes to the food of the inhabitants of that region has not yet been reported, no doubt it shares with the Fall-fish in adding to the viands of the table. It is smaller than the common Pike of the Baltimore markets.

S. I.

2—E. reticulatus.

Pike, The Common Pickerel.

Body nearly cylindrical, elongate; much flattened upon the back; scales small; snout blunt; upper jaw smooth, broad, depressed, shorter than the lower jaw. The color of this pike varies in intensity and tint. In some it is deep green, varying to blackish on the back and head, or bluish grey; in others it is of a golden or olive-yellow on the sides, the free margins of the scales bordered with black. Numerous, irregular, abbreviated, longitudinal, dusky streaks on the sides of the body, united with similar oblique streaks produce the imperfectly reticulated appearance. Dorsal fin nearly square, slightly rounded above; the last ray, much the shortest.—Length, 1 to 3 feet.

Fin-rays:—D. 18; P. 13; V. 10; A. 17; C. 19.

E. reticulatus, Lesueur, Journ. Acad. Nat. Sc. Phil. I. 1818, p. 414; Storer, Report Fish. Massach, p. 97; Kirtland, Zool. Ohio, p. 194; DeKay, New York Faun. Fish, p. 223, pl. 34, fig. 107; Cope. Proc. Acad. Nat. Sc. Philad. 1865, p. 19.

Esox lucius, Var., Mitch. Lit. & Phil. Trans. New York, I. p. 440.

Widely distributed in the quiet and grassy tributaries of the tide-water region of both shores. Much esteemed, particularly by the farmers of the more central counties. Sold in the towns of Worcester county by hucksters, who transport them in light wagons from place to place. The placid creeks of the marshes bordering and connecting with Sinepuxent and Newport Bays, where the *Nymphæa odorata* and *Brasenia peltata* grow luxuriantly, are the favorite haunts of these fish, and there they may be seen basking at the surface in the full sun-blaze of a summer's day.

Acad. Coll. S. I.

3—E. niger.

Varied Pickerel.

Body cylindrical, with its upper surface much flattened. Upper part of head with a deep, longitudinal groove. Dorsal fin higher than long, its margin much rounded.

Dark brownish-black above, descending in irregular dark clouds a short distance on the sides. Sides greenish-yellow, with irregular vertical, brown stripes descending on the belly. Dorsal and caudal fins dark brown; a short dark band from the eye to the angle of the jaw.

Fin-rays:—D. 15; P. 15; V. 9; A. 14; C. 19.

E. niger, Guenther, VI. p. 229.

Esox scomberius, Mitchill.

—*niger*, Lesueur, Journ. Ac. Nat. Sc. Philad. I. p. 415.

— *americanus*, Cuv. & Val. XVIII. p. 329.

—*fasciatus*, DeKay, New York Faun. Fish, p. 224, pl. 34, fig. 110; Cope. Proc. Acad. Nat. Sc. Phil. 1865, p. 79.

In Maryland, probably confined to the Eastern Shore. Specimens scarcely, if at all, now reach the Baltimore markets.

XLIV—UMBRIDÆ.

UMBRA, Kramer.

U. limi.

Has the shape of *Fundulus viridescens*. Back nearly straight, flat, and slightly depressed in front of dorsal fin. Head flattened above, slightly descending to the pointed snout. Scales large. Eyes large, near the snout; mouth small. Olive-brown, with numerous transverse bars across the body and tail; a distinct black line in the course of the lateral line; across the tail is a broad, black bar; fins light olive-brown. The dorsal fin of fifteen rays is placed far back, and has the third ray longest. Length, 2 to 3½ inches.

Fin-rays:—D. 15; P. 15; V. 6; A. 10; C. 12.

U. limi, Guenther, VI. p. 232.

Hydrargyra limi, Kirtl. Bost. Journ. Nat. Hist. III. p. 277, pl. 2, fig.4.

— *atricauda*, DeKay, New York Fauna. Fishes, p. 220.

—*fusca*, Thompson, Nat. Hist. Vermont, p. 137.

Fundulus fuscus, Ayres, Boston Journ. Nat. Hist. IV. p. 206, pl. 13, fig. 2.

Common in the Patapsco region where the water is brackish and where small creeks empty into the estuaries.

ACAD. COLL.

XLV—CYPRINODONTIDÆ.

FUNDULUS, Lacep.

1—F. viridescens.

Mud-Dabbler, Big Killie, or Minnow.

Body elongated, cylindrical, flattened above, much compressed on the sides of the tail. Scales large; very large on the head, extending to the end of the snout; a central one on the summit of the head, with its entire margin free. Head very small, flattened above, with large and distant eyes. Olive-green above, lighter on the sides; whitish, tinged with yellowish, on the abdomen. Length, 3 to 5 inches.

Fin-rays:—D. 11; P. 17; V. 6; A. 11; C. 29.

F. viridescens, Schœpff, Beobach. der Naturf. etc., vol. VIII, p. 172; Nat. Hist. of New York, p. 217, pl. 31, fig. 99.

Hydrargyra pisculenta, Mitchill. Storer's; Syn. of the fishes of N. A. in Mem. Am. Acad. of Arts and Sciences, vol. II, p. 432.

Common in the brackish waters of the Western Shore on the Bay side. In the regions of the Patapsco, they live in shallow waters, where small creeks and branches empty into the estuaries. Their habits are carnivorous, and they find welcome food in the beach-fleas, which abound in such places.

Acad. Coll.

2—F. fasciatus.

Mud-Dabbler, Striped Killie Fish, or May Fish.

Body oblong, somewhat compressed. Head depressed. Dusky greenish on the back; darker on the head above. Sides brassy-yellow, tinged with green; lighter beneath. Along the sides are faint indications of dusky bars, which become on the tail distinctly marked black bars, or lines of interrupted black dots. Besides these bars there are also from two to five irregular, longitudinal stripes of various lengths. Dorsal and anal with numerous white dots.—Length, 2 to 4 inches.

Fin-rays:—D. 14; P. 15; V. 6; A. 11; C. 23.

F. fasciatus, Schœpf, Beobach. Ntfr. Fr., vol. VIII, p. 173; Nat. Hist. of New York, p. 216, pl. 32, fig. 98.

Hydrargyra fasciata, Schn.; Storer's Synops. of the Fishes of N. A. in Mem. of the Am. Acad. of Art and Sciences, vol. II, p. 432.

This fish is abundant in the tide-water of creeks, emptying into the Patapsco and Magothy rivers; it is very variable in its markings, the stripes being often obsolete and only indicated by dots or short lines.

ACAD. COLL.

3—F. heteroclitus.

Mud-Dabbler.

The height of the body equals the length of the head, and is contained thrice and two-thirds in the total length (without caudal); males have the body comparatively shorter. Coloration uniform (in spirits.) Length, 2 to 5 inches.

Fin-rays:—D. 11; P. 17; V. 6; A. 11; C. 19.

F. heteroclitus, Guenther, VI, p. 318.

Cobitis heteroclyta, L. Syst. Nat. I, p. 500.

Patapsco River, particularly around the shores of the coves in the vicinity of Salt-marshes.

ACAD. COLL.

4—F. pisculentus.

Mummichog, or Ornamented Minnow.

Body oblong, stout, compressed behind. Top of head and back flattened. Head one-fourth of the length of fish. Female of a uniform brown color. Male, lighter at intervals upon the sides, presenting the appearance of transverse bands. Dorsal and anal fins with black dots. Length, 2 to 4 inches.

Fin-rays:—D. 12; P. 15; V. 6; A. 9—10; C. 20.

F. pisculentus, Guenther, VI, p. 324.

Esox pisculentus, Mitch. Lit. & Phil. Trans. New York, I, p. 441.

Fundulus pisculentus, Cuv. & Val., XVIII, p. 190; Storer, Mem. Am. Ac., V, p. 294, pl. 23, figs. 3 and 4.

Abundant in the Patapsco River, and swims in small shoals near the shores in muddy coves at the mouths of creeks. It is an excellent bait for other fishes.

ACAD. COLL.

6—F. multifasciatus.

Mud-Dabbler, or Mummichog.

Body cylindrical, more compressed behind. Head broad and flattened; its length is greater than the greatest depth of the fish, and less than one-third its entire length. Caudal fin broad, nearly straight at its termination. Olive above; sides lighter; lower portion of opercles silvery; throat and back portion of abdomen bluish-grey. The body is transversely marked with numerous bluish bands, (about fifteen) and dotted with darker minute points. Length, 2 to 3 inches.

Fin-rays—D. 13—14; P. 18; V. 5; A. 12—13; C. 16.

F. multifasciatus, Guenther, III, p. 324.

Hydrargyra multifasciatus, Lesueur. Journ. Ac. Nat. Sc. Philad. I, 1817, p. 131.

Fundulus multifasciatus, Cuv. & Val. XVIII, p. 200: Cope, Proc. Acad. Nat. Sc. Philad. 1865, p. 78.

Was formerly very common in the region of black marsh around the Patapsco River. The chemical manufacturies having polluted the waters, many of these fish have died out, and their extermination seems imminent.

Acad. Coll.

HYDRARGYRA, Lac.

H. majalis.

Bull-Minnow, or Striped Killifish.

Body elongated, slightly convex on the dorsum over the pectorals in the female, nearly straight in the male. Greatest depth of the body. which is across the pectorals, less than the length of the head; the latter, which is equal in length to one-fourth of the entire length of the fish, is compressed above. Female yellowish-green above, lighter upon the sides, white beneath; several longitudinal, interrupted, black bands (sometimes five, sometimes not more than one or two), extend from the gill-covers to the tail. At base of tail three or more less distinct transverse bands. Male with greenish-black sides and back; sides crossed by numerous, slate-colored, nearly black, transverse bands. Lower portion of sides, and abdomen, yellowish-green. Dorsal fin with a black roundish spot, before which—in larger specimens—are three or four broken, dark-colored blotches. The orange-colored caudal fin is margined with black. Length, 3 to 7 inches.

Fin-rays:—D. 14—16; P. 16—18; V. 6; A. 11—12; C. 18—20.

Esox flavulus, Mitch. Lit. & Phil. Trans. New York, I, p. 439, pl. 4, fig. 8.

Cyprinodon flavulus, Valenc. in Humb. Obs. Zool. I, p. 164, pl. 32, figs. 3, 6 & 7.

Hydrargyra trifasciata, Storer, Journ. Soc. Nat. Hist. Boston, I, 1837, p. 417.

— *flavula*, Storer, Mem. Amer. Ac. V, pl. 25, figs. 5 & 6; Baird, Ninth Smithson. Report, 1855, p. 344.

Hydrargyra majalis, Cuv. & Val. XVIII, p. 207.

Fundulus majalis, Guenther, VI, p. 322.

This beautiful and large species inhabits the Patuxent and Potomac Rivers, and perhaps other parts of the tide-waters of the western shore, south of the Patapsco. As yet, it has not been reported from the latter river.

ACAD. COLL.

XLVI—PERCOPSIDÆ.

PERCOPSIS, Agassiz.

P. guttatus.

This fish, shaped like a young Salmon, is of small size and slender form, though the back is very much elevated. Sides compressed, gradually diminishing in thickness from the front backwards. Ground color yellow, much darker above the lateral line than below. On the back are blackish-brown spots, sometimes disposed in two or three longitudinal rows, wishout great regularity. Along the middle of the body is a silvery ridge. A small adipose fin is situated at about equal distance between the end of dorsal and base of the caudal.

Fin-rays:—D. 2. 10; P. 12; V. 8; A. 1. 7; C. 26.

P. guttatus, Agass. Lake Super. p. 286, pl. 1, fig. 1—2.

— *pellucida*, (Salmoperca), Thompson, Proc. Bost. Soc Nat. Hist. III, 1851, pp. 164, 306.

Inhabits the lower Potomac River, and is often mistaken for a young Salmon. Prof. Baird has seen specimens from the Susquehanna River.

S. I

XLVII—SYNODONTIDÆ.

SYNODUS, (Gron.) Bl. Schn.

F. fœtens.

Providence Whiting.

Body elongated, though tolerably stout; nearly round, or a little depressed. Head broad, and triangular, if seen from above, with the snout pointed. Mouth very large; lower jaw shorter than the upper, and when the mouth is shut, leaving the teeth of the upper exposed. Back and sides above mottled reddish or olive-brown, varying much in tint; sides below lateral line paler: belly faint yellow. Total length, 20 to 26 inches.

Fin-rays:—D. 11; P. 18; V. 1. 5; A. 10; C. 24.

S. fœtens, Catesby, South Carolina, II, p. 2, tab. 2, fig. 2.

Salmo fœtens, L. Syst. Nat. I, p. 513.

Coregonus ruber, Lacep., V, pp. 244, 263.

Saurus fœtens, Cuv. & Val., XXII, p. 471; Holbr. Ichth. S. Car., p. 187, pl. 26, fig. 1.

Occurs in the tide water part of the Potomac River, and along both shores of the Southern end of the Eastern Shore.

ACAD. COLL.

XLVIII—SALMONIDÆ.

SALMO, Artedi.

S. fontinalis.

Brook-Trout, or Red-Spotted Trout.

Body elongated, compressed. Length of flattened head equal to about one-fifth of the whole length of fish; snout obtuse. Scales very small. Adipose fin quite small, and near the tail. Upper part of the body pale-brown, mottled with darker, undulating, reticulated markings; sides lighter, with numerous, round, yellow spots, varying in size from a small point to a line or more in diameter, and many with a bright red spot in the centre. Very variable, as almost every locality has its peculiar colored Trouts. Body beneath white. Some of the fins are often mottled with black spots. Length, 6 to 20 inches.

Fin-rays:—D. 11; P. 13; V. 8; A. 11; C. 19.

S. fontinalis, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 435; Richards Fauna Bor. Amer. III, p. 176, pl. 83, fig. 1 and pl. 87, fig. 2; Storer, Report Fish. Massach., p. 106; DeKay, Fauna New York, Fish, p. 235, pl. 38, fig. 120.

Baione fontinalis, DeKay, l. c. p. 244, pl. 20, fig. 58.

Salmo erythrogaster, DeKay, l. c. p. 236, pl. 39, fig. 126.

This is the "Brook Trout," of our clear streams, particularly in the mountainous regions of the State. Of late years it has been exterminated in most of the streams near Baltimore.

Acad. Coll.

XLIX—HYODONTIDÆ.

HYODON, Lesueur.

H. tergisus.

Mud Shad, The River Moon-Eye.

Body compressed, back very slightly arched. Scales large, ascending high up on the base of the caudal. Head small; eyes very large, nearly filling up the whole space between the angle of the jaws, and the upper part of the head. Back bluish; sides silvery. Fins tinged with yellow; base of caudal rays dusky. Length, 9 inches.

Fin-rays:—D. 15; P. 15; V. 7; A. 29; C. 18.

H. tergisus, Lesueur, Journ. Ac. Nat. Sc. Philad. I p. 336; Kirtland, Rep. Zool. Ohio, p. 170, 195, and Bost. Journ. Nat. Hist. V, 1846, p. 338; DeKay, New York Fauna, Fish, p. 265, pl. 41, fig. 130; Cuv. & Val. XIX, p. 309, pl. 572; Girard, U. S. Pac. R. R. Exped., Fish, p. 332 pl. 75, fig. 1—4.

Occurs in the canal in Washington county. It seems to be little esteemed for food; being considered bony and unsavory. Seems to be frequently confounded with the Hickory-Shad of our tide-water districts.

Acad. Coll.

L—ELOPIDÆ.

ELOPS, Linn.

E. saurus.

Big-Eyed Herring, or Jackmariddle.

Form much elongated, nearly cylindrical, round on the back, slightly flattened on the belly, and a little compressed on the sides, but more so near the tail. Head long and thick, with a full and round muzzle. Eyes very large; mouth wide, extending behind the orbit of the eye. The lower jaw seems longer than the upper, but it is in fact let into it when the mouth is closed. The head is pale green above, white on the sides; the body is pale silver-gray above, or with a faint greenish tint, and silvery on the sides and belly. Total length, 24—30 inches.

Fin-rays:—D. 24; P. 18; V. 1. 5; A. 17; C. 28.

E. saurus, L. Syst. Nat. 1, p. 518; Bloch, Taf. 393, fig. 1; DeKay, New York Fauna, Fish. p. 267, pl. 41, fig. 131: Cuv. and Val. XIX, p. 365.

— *inermis*, Mitchill, Lit. & Phil. Trans. New York, I p. 445.

Enters our large rivers from the salt waters of Chesapeake Bay, but seems to be quite uncommon. Specimens have been taken in the St. Mary's River. One from Tangier Sound measured 20 inches in length.

ACAD. COLL.

LI—DUSSUMIERIDÆ.

ETRUMEUS, Bleek.

E. teres.

Round Herring.

Body elongated, cylindrical. Length of head to the total length as one to five (nearly). Scales, large, round, ascending on the caudal fin. Head long and pointed, with a deep furrow on the summit. Eyes and mouth large, the latter protractile. Bright silvery; darker above, with a tinge of blue and yellow on the flanks; sides of the head metallic silvery, mixed with cupreus. Dorsal and caudal tinged with yellow; the remaining fins transparent, feebly punctated with black. Length, 6 to 8 inches.

Fin-rays:—D. 19; P. 15; V. 10; A. 12; C. 19.

E. teres, Guenther VII, p. 467.

Alosa teres, DeKay, New York Fauna, Fish, p. 262, pl. 40, fig. 128; Baird, Ninth Rep. Smithson. Inst. 1855, p. 349.

Dussumieria teres, (Brevoost) Gill, Proc. Acad. Nat. Sc. Philad. 1860, p. 21.

Harengula teres, Girard, Proc. Acad. Nat. Sc. Philad, 1859, page 158,

Ocean coast of Worcester county. Seems to be uncommon, but is said to have been brought to the markets of Baltimore.

LII—CLUPEIDÆ.

BREVOORTIA, Gill.

B. menhaden.

Ale-Wife, or Menhaden.

Body elongated, compressed. Its depth across, at the base of the pectorals, less than one-fifth the length of the fish; length of the head more than one-third the length of it. Gill covers very large; eyes round and moderately in size; gape of mouth very large. Upper part of body greenish-brown, darker upon the top of the head and at the snout; upper part of the sides in the living fish rose-colored, and mottled with blue, which disappear in death: abdomen silvery; a black spot, more or less distinct, upon the shoulders; whole surface of the fish iridescent. Length, 10 to 14 inches.

Fin-rays:—D. 19; P. 15—17; V. 6; A. 18—22; C. 20.

B. menhaden,, Mitch. Lit. & Phil. Trans. New York, I. p. 453, pl. 5, fig. 7.

Alosa menhaden, Storer, Report Fish. Massach. p. 117; De-Kay, New York Faun., Fish. p. 259, pl. 21, fig. 60; Ayres, Bost. Journ. Nat. Hist. IV. p. 275; Storer, Mem. Am. Ac. VI. p. 337, pl. 26, fig. 3.

Brevoortia menhaden, Gill. Proc. Ac. Nat. Sc. Philad. 1861, p. 37.

Common on the Atlantic coast of Worcester county and even entering Sinepuxent Bay, also in vast shoals in Chesapeake Bay, particularly about the mouths of the great rivers of both peninsulas. They have been extensively used for manure by the farmers living near the coast, where they are caught by untold thousands in the large seines.

Acad. Coll. S. I.

ALOSA, Cuv.

A. sapidissima.

American Shad.

Body oblong, compressed. Head equal in length to one-sixth of the entire fish; the greatest depth of the body exceeds the length of the head. Covered throughout with large, deciduous scales, with the exception of the head, which is naked. The upper jaw with a deep notch in the centre. Upper portion of the sides cupreous; lower portion silvery, with a greenish tinge; abdomen pearly; top of head and back bluish. A black blotch of considerable size at the hind angle of the operculum. Length, 20 inches.

Fin-rays:—D. 17—19; P. 16; V. 9; A. 20—22; C. 20.

Two young specimens were caught May 7th, by Major T. B. Ferguson, near the mouth of Elk River. The measurements were as follows,—Total length to tip of caudal fin 5 inches; greatest width 1⅛ inches; length of head 1⅐ inches. Head contained 3⅔ times in the length of the body excluding caudal fin. Color silvery, back olive.

Clupea sapidissima, Wilson, in Rees' New Cyclopaedia, 1st Amer. Ed. Art. *Clupea*.

Alosa sapidissima, Storer, Synops. p. 458, No. 1.

This is the American Shad so highly prized by Marylander's of the tide-water districts. It is the most savory of all our fishes, and was formerly common in all the rivers emptying into the Chesapeake Bay on the Western shore, and in the principal ones of the Eastern shore.

The principal fisheries of it are now in the Susquehanna, Potomac and Chester Rivers, although smaller numbers are taken in the Patuxent and Severn. It has been almost cleared out of the Patapsco River, although a few stragglers venture up to get beyond tide during almost every spring. There are several "runs" of this fine fish in the lower Potomac River, which follow each other at intervals of a few days.

ACAD. COLL. S. I.

OPISTHONEMA, Gill.

O. thrissa.

Shad Herring, or Thread Herring.

Body compressed, elliptical. The height of the body is one-third of the total length (without caudal,) the length of the head rather less than one-fourth. Lower jaws but slightly prominent. Abdomen with fourteen projections like saw-teeth. Bluish above, with an indistinct bluish spot on the shoulder; each scale on the back with a dark spot, the spots forming longitudinal series. Last dorsal ray produced into a long filament. Length, 8 to 12 inches.

Fin-rays:—D. 19; P. 18; V. 8; A. 23—24; C. 19.

O. thrissa, Osbeck, Reise p. 336.

Meletta thrissa, Cuv. & Val., XX. p. 380.

Chatoessus signifer, DeKay, New York Faun., Fish. p. 264, pl. 41, fig. 132.

Opisthonema thrissa, Gill, Proc. Ac. Nat. Sc. Philad. 1861, p. 37.

Enters the tributaries of Chesapeake Bay in the salt waters, but is never abundant. Occurs annually along the coast in September. Have been brought to the markets of Baltimore, but not in large numbers.

Acad. Coll. S. I.

POMOLOBUS, Gill.

1—P. pseudoharengus.

Herring, Ale-Wife (of farther North.)

Form elliptical, a little thickened along the back; the curve of the dorsal outline a little less than that of the ventral: belly compressed; slope behind the dorsal fin very gradual: greatest breadth just in front of the dorsal fin and which is about equal to one and a-half lengths of head; head contained about six times in the length to tip of tail-fin; caudal fin deeply emarginated. Color of back steel-bluish, or greenish: the head above and tip of lower jaw of the same color; sides and belly silvery, the former with from four to six dusky lines. Length, 8 to 10 inches.

Fin-rays:—D. 4. 13; P. 1. 4. V. 1. 8; A. 18; C. 21.

P. pseudoharengus, Wilson, in Rees' New Cyclopædia, 1st Amer. Ed. IX, Art. *Clupea.*

Alosa. tyrannus, DeKay, New York Fauna, p. 258, pl. 13, fig. 38.

This is the "Glut Herring" of the Potomac River, so called from the vast shoals which crowd that river during the spawning season, in May.

It deposits its eggs on the bottom of the river, seeking localities where the water is fresh, and apparently preferring the hard beds where the *myriophyllum* grows, and no doubt where the water is well ærated. A form which we can hardly regard as a distinct species, deposits its eggs in the small branches in the same region, and thence takes the name of "Branch Herring."

At the mouth of the Susquehanna River, and at Chesapeake City on the Elk River, as well as in the Chester River it gives rise to important fisheries, which were formerly a great source of revenue to the inhabitants. The "Maryland Red Herring" was once a well known and highly esteemed article here and in many of the States north of Maryland, but this institution has died out by reason of the changes, which have taken place in the habits of our people.

Acad. Coll. S. I.

2—P. mediocris.

Autumnal Herring, or Tailer Shad.

Body elongated, compressed. Head equal in length to about one-fifth the entire fish; the lower jaw is the longer; chin prominent, eyes large; abdomen serrated; scales large and rounded. The sides of the fish are silvery, with six or eight indistinct, bluish bands running from the head to the tail, which are light-colored after death. Pectoral and caudal fins dark-brown; anal and ventral fins nearly white.—Length, 12 to 20 inches.

Fin-rays:—D. 17; P. 16; V. 8; A. 20; C. 20.

C. mattowocca, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 451, pl. 5, fig. 8.

Clupea mediocris, Mitch. l. c.

Alosa mattowocca, DeKay, New York Fauna, Fishes, p. 260, pl. 11, fig. 127; Ayres, Bost. Journ. Nat. Hist. IV.

— *tyrannus*, DeKay, l. c. p. 258, pl. 13. fig. 38.

— *lineata*, Storer, Proc. Bost. Soc. Nat. Hist. II, p. 242. and Mem. Amer. Ac. VI, p. 340, pl. 27, fig. 2.

Caught in the Potomac River in the large seines, when being hauled in the Spring for the Shad.

It attains a length almost equal to the Shad, but is of a more slender form. As an article of food it is not popular with the fishermen of the Potomac.

Acad. Coll. S. I.

LIII—DOROSOMIDÆ.

DOROSOMA, (Raf.) Gill.

D. cepedianum.

Toothed Herring, The Old Wife.

Height of body contained twice and three-fifths in the total length; length of head four times. Back much arched. Oval, compressed. Head small; eyes of medium size; snout slightly projecting beyond the mouth. Belly serrated; scales large. The last ray of dorsal fin much elongated. Dusky above, sides and abdomen white; many specimens with a dark spot on the shoulders. Length, 8 to 12 inches.

Fin-rays:—D. 12; P. 16; V. 8; A. 33; C. 19.

Megalops cepediana, Lesueur, Ac. Nat. Sc. Phila., I, 1817, p. 361.

Chatœssus cepedianus, Cuv. & Val., XXI, p. 72, pl. 612.

— *ellipticus*, Kirtl. Rep. Zool. Ohio, pp. 169, 195; Boston Journ. Nat. Hist. IV, p. 235, pl. 10, fig. 1.

— *insociabilis*, Abbott, Proc. Ac. Nat. Sc. Phila., 1860, p. 365.

— *cepedianus*, Guenther, VII, p. 409.

Generally preceding the shad; but little valued. When imprisoned by freshets in inland streams, they thrive well.

They were formerly seen in large shoals in the Baltimore docks, but recently they have failed to appear there.

They occur in the Potomac, Patapsco and other rivers of both peninsulas.

Acad. Coll. S. I.

LIV—ENGRAULIDÆ.

ENGRAULIS, Lacep.

E. vittatus.

Gudgeon, or Anchovy.

Elongated, elyptical, compressed. Head elongated, sharp wedge-shaped, broad above. Eyes large; jaws unequal, the upper much longer, into which the lower jaw shuts as into a groove. Scales very large. Caudal fin deeply forked. Top of head bluish-slate; back light green, dotted with brownish; a greenish-blue stripe high up on the side, extending from the eye to the tail; sides below greenish-silvery, with metallic reflections. Gill-covers and abdomen silvery. Length, $3\frac{1}{2}$ inches.

Fin-rays:—D. 8; P. 17; V. 5; A. 14; C. 18.

Clupea vittata, Mitchill, Trans. Lit. & Phil. Soc. New York, I, p. 456; DeKay, New York Fauna Fishes, p. 254.

Engraulis mitchilli, Cuv. & Val. XXI, p. 50; Guenther, VII, p. 391.

Runs from the salt water into our creeks and branches in April—May to spawn, and is then taken by the hook in large numbers. It is a savory little fish, and highly popular with Baltimore anglers.

Acad. Coll.

LV—CYPRINIDÆ.

CATOSTOMUS, Lesueur.

1—C. communis.

Mud Sucker.

Body cylindrical, broad and rounded above the origin of the dorsal fin, and compressed towards the tail. Head smooth, scaleless; caudal fin almost furcate. Scales small on the anterior part of body, increasing in size towards the tail. Head dark green, nearly black; cheeks bronze and golden: body above purplish, with pink and metallic tints on the sides; beneath white. Length, 14 to 16 inches.

Fin-rays:—D. 13—14; P. 16—18; V. 10; A. 8—9; C. 17—18.

Catostomis communis, Lesueur; Journ. Ac. Nat. Sc. Phila. I, p. 1817, p. 95; DeKay, New York Fauna, Fishes, p. 196. pl. 33, fig. 106.

Common in most of our small streams away from brackish water. The rank taste of the flesh renders it distasteful to many persons, but in the interior sections of the Western shore it is generally eaten by the people.

In early Summer these fish build their nests of piles of sand and stones, and shortly afterwards their dead bodies may sometimes be found in dozens along the shores of streams such as Gwynn's Falls.

Acad. Coll.

2—C. nigricans.

Black, or Mud Sucker.

Similar in shape to the preceding. Head large and square. Black above; reddish yellow on the sides, with black blotches; beneath white. Dorsal fin black, the other fins reddish.—Length, 10 to 13 inches.

Fin-rays:—D. 11; P. 18; V. 9; A. 8; C. 18.

C. nigricans, Lesueur, Journ. Ac. Nat. Sc., I. 1817, p. 102; Kirtland, Boston Journ. Nat. Hist., V. p. 273, pl. 21, fig. 3.

Found in the Youghioghany River, in the mountains of Maryland.

S. I.

3—C. duquesnii.

Red Horse, or Pittsburg Sucker.

The height of the body is nearly equal to the length of the head, which is one-fourth of the total (without caudal). The strong scales are of nearly the same size over the entire body. Back and forehead dusky-olive and coppery; sides coppery; abdomen white. Length, 12 to 19 inches.

Fin-rays:—D. 14; P. 17; V. 10; A. 9; C. 18.

C. duquesnii,, Lesueur, Journ. Ac. Nat. Sc., Philad., I. p. 105; Kirtland, Boston Journ. Nat. Hist., V. p. 268, pl. 20, fig. 1, pl. 21, fig. 2.

— *erythrurus*, Rafinesque.

Ptychostomus duquesnii, Agassiz, Am. Journ. Sc. & Arts, XIX. 1854, p. 90.

Found in the Youghioghany River.

4—C. maculosus.

Jack Mullet, or Black Sucker.

Head large, square, declivous. Eyes small. Lateral line straight. Reddish, with irregular black blotches. Pectorals and ventrals reddish, dashed with black; anal and caudal reddish white; dorsal bluish, with black marks on the rays. Lengeh, 6 to 9 inches.

Fin-rays:—D. 12; P. 16; V. 9; A. 9; C. 18.

C. maculosus, Lesueur, Journ. Ac. Nat. Sc. Philad., I. 1817, p. 103.

This beautiful Sucker lives in the stony and rocky portions of our creeks, in places where the current ripples. Specimens may be seen resting motionless on a flat rock at the bottom of the water, and darting away with instant rapidity upon the approach of man. The larger ones take shelter beneath rocks, with cavities on the underside, and there they remain except when tempted away in search of food. This species inhabits the upper Potomac, the Patapsco, and several of our creeks near Baltimore.

Acad. Coll.

5—C. macrolepidotus.

Carp, or The Large-Scaled Sucker.

Body compressed and fusiform, elevated on its anterior part, rounded near the nape. The large scales are disposed in a lozenge form. The dorsal fin is deeply emarginated. The back is dark blue; the sides are whitish, with yellowish reflections: the head is reddish brown. Length, 12 to 15 inches.

Fin-rays:—D. 16; P. 18; V. 9; A. 9; C. 18.

C. macrolepidotus, Lesueur, Journ. Ac. Nat. Sc. Philad. I, 1817, p. 94; DeKay, New York Fauna, Fishes, p. 202, pl. 77, fig. 242.

This finest of all our suckers belongs to the region adjacent to the mouth of the Elk River. A very fine specimen was obtained near Specutia Island by Major T. B. Ferguson.

It is esteemed in the Philadelphia markets, but is not brought to those of Baltimore. It well deserves to be protected and developed.

ACAD. COLL.

CARPIODES, (Rafin.) Agassiz.

C. cyprinus.

Long-Finned Chuck-Sucker.

Body elliptical, compressed; its height is more than one-third of the total length. The anterior dorsal rays very much longer than the rest; caudal fin deeply forked. The scales are variegated with blue, yellow and green, and all the fins are grey-blue. Length, 8 to 20 inches.

Fin-rays:—D. 27—32; P. 18; V. 9; A. 9—10; C. 18.

C. cyprinus, Guenther VII, p. 24.

Catostomus cyprinus, Lesueur, Journ. Ac. Nat. Sc. Philad. I, 1817, pp. 91, 110.

Labeo cyprinus, DeKay, N. Y. Faun. Fish. p. 194, pl. 77, fig. 243.

Sclerognathus cyprinus, Kirtland, Boston, Journ. Nat. Hist. V, p. 275, pl. 22, fig. 2.

Carpiodes vacca, Agass. in Am. Journ. Sc. & Art. XVII, 1854, p. 356.

This very singular fish inhabits the northern part of Chesapeake Bay near the mouth of the Elk River. It was formerly brought to the Baltimore markets, but recently has not appeared there. In the markets of Philadelphia it still holds a place, and finds a ready sale.

MOXOSTOMA, (Refinesque.) Agassiz.

M. oblongum.

Common Mullet, or Horned Sucker.

Body robust, cylindrical. Scales large. Lateral line indistinct. Head smooth. Between the eyes and the snout, on each side, are from three to five tubercles. Eye very small, in the middle of the length of the head. The lower lip broad and bilobed. Head dark olive-green; back and sides of body green; sides tinged with yellow; abdomen yellowish. Anal fin dark blackish-brown; the caudal lighter, and the remaining fins light olive-green. Length, 7 to 9 inches.

Fin-rays:—D. 15; P. 16; V. 8; A. 10; C. 19.

M. oblongum, Mitch. Guenther VII, p. 21; Lesueur. Journ. Acad. Nat. Sc. Philad. 1817, I, p. 108; DeKay, New York Fauna, Fishes, p. 199, pl. 31, fig. 97.

This golden sucker inhabits the brackish water of the Patapsco River and two of its tributaries. The young ones may sometimes be seen among the Myriophyllum in the estuaries where the clear spring-water enters a cove, but not the older ones. The latter seem to enjoy the presence of the eel-grass, and sometimes may be seen there in small groups. Their food is at least in part vegetable, since undigested seeds in quantity have been taken from their stomachs.

Acad. Coll. S. I.

CARASSIUS, Nilsson.

C. auratus.

Gold-Fish, Golden Carp.

This well-known fish has been so much influenced by domestication, that it is almost impossible to apply any distinctive phrase. There is an indefinite variety in color, shape, position of fins, even in their number, etc. It is generally long oval, brilliant red or orange above, silvery beneath. The scales are large, and rough to the touch. The following number of rays is often observed.

Fin-rays:—D. 16; P. 15; V. 9; A. 18; C. 17.

C auratus, introduced.

Cyprinus auratus, L. Syst. Nat., I. p. 527; Lacep. V. p. 553; Cuv. & Val., XVI. p. 101.

Found in moderate numbers in the Potomac River, south of Alexandria, where it has been introduced from abroad. Specimens from that locality are stout and clumsy, with large scales; and attain a length of at least one foot.

Acad. Coll. S. I.

EXOGLOSSUM, Rafinesque.

E. maxillingua.

Chub-Sucker.

The height of the body is nearly one-fifth of the total length (without caudal fin), the length of the head a little less than one-fourth. Caudal fin emarginate. Color olivaceous, smoky above; a blackish band from pectoral fin to superior extremity of gill opening. Length, 4 to 8 inches.

Fin-rays:—D. 8; P. 12; V. 8; A. 8; C. 18.

C. maxillingua, Guenther, VII, p. 188.

Cyprinus maxillingua, Lesueur, Journ. Ac. Nat. Sc. Philad., I, p. 85.

Exoglossum maxillingua, Agass. Amer. Journ. Sc. & Arts, 1853, XIX. p. 215; Cope, Journ. Ac. Nat. Sc. Philad., XIII. p. 360, pl. 11, fig. 1.

Sykesville, in Piney-run, tributaries of Patapsco River, Gwynn's Falls, above tide, Jones Falls and Pipe Creek.

The shovel-shaped lower jaw of this species admirably adapts it for lifting the small *Physas* and other shells from the rocks; and it is in the rocky parts of our streams that it is usually to be seen.

Acad. Coll. S. I.

SEMOTILUS, Rafinesque.

1—S. rhotheus.

Fall-Fish, Shiner, or Shining Dace.

Body rather deep, compressed, elongate; its height nearly one-fourth of total (without caudal.) Scales large, with the free margins festooned with elevated radiate lines. The colors are very brilliant, having as ground a very pure silver white: the back is often steel-blue, and sides of head bright rose colored. In spring and summer the adult males have rosy shades, and the dorsal and pectoral fins are crimson. Length. 4 to 12 inches.

Fin-rays:—D. 1. 8; P. 17; V. 8; A. 8; C. 18.

Leuciscus pulchellus, Storer, Rep. Fish. Massach., p. 91; Cuv. & Val., XVII. p. 320.

— *nitidus*, DeKay, New York Fauna, Fish., p. 209, pl. 33, fig. 105.

Cheilonemus pulchellus, Storer, Mem. Am. Ac., V, 1855, p. 286, pl. 22, fig. 2.

Leucosomus pulchellus, Girard, Proc. Ac. Nat. Sc. Philad., 1856, p. 189; Guenther, VII, p. 268.

Hybognathus nitidus, Girard, l. c. p. 210.

Squalius hyalope, Cope, ibid. 1864, p. 280.

Semotilus rhotheus, Cope, Journ. Ac. Nat. Sc. Philad., XIII, p. 362, pl. 10, fig. 1.

Common in the Upper Potomac, in Frederick and Montgomery counties, also in the Monocany and upper portion of the Patapsco River.

Specimens from Frederick county have been caught, which weighed nearly five pounds.

Greatly esteemed as an article of food, and deserves to be propagated in large numbers.

Acad. Coll. S. I.

2—S. corporalis.

Little Fall Fish, or Corporaaleu.

Similar in shape to *Semotilus rhotheus*, but well distinguished from it by the narrowness of the exposed portion of the scales anteriorly as compared with that posteriorly, by a dark spot at the base of the dorsal fin, and darker colors above. Its general color has not the vigor and beauty of *rhotheus*; it is blackish above, cream colored below, with a dark shade through the eye. Length, 6 to 12 inches.

Fin-rays:—D. 1. 7; P. 17; V. 8; A. 9; C. 18.

Cyprinus corporalis, Mitchill, Am. Monthl. Mag. II p. 324; DeKay, New York Fauna, Fish. p. 213.

— *atromaculatus*, Mitchill, l. c.

Leuciscus atromaculatus, DeKay, l. c. p. 210, pl. 32, fig. 102.

Semotilus atrimaculatus, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 204.

— *corporalis*, Cope, Journ. Ac. Nat. Sc. Philad. XIII, p. 362, pl. 10, fig. 2.

Leucosomus corporalis, Guenth, VII. 269.

Occurs in the upper Potomac, in Montgomery and Frederick counties, but seems to be scarce.

Acad. Coll. S. I.

CERATICHTYS, Baird & Girard.

C. biguttatus.

Stony-Head.

This is a cylindrical, stout fish, with large scales; its head enters three and three fourths times into the length to the origin of the caudal fin. It is brownish cream-colored, shaded with slate above the lateral line, where the scales are tipped and margined with the same. Length, 6 inches.

Fin-rays:—D. 1.8; P. 15; V. 8; A. 7; C. 19.

C. biguttatus, Kirtland, Bost. Journ. Nat. Hist. III, 1840, p. 344.

Leuciscus biguttatus, DeKay, New York Fauna, Fish, p. 214.

Ceratichthys biguttatus, Cope. Journ. Acad. Nat. Sc. Philad. XIII, p. 366, pl. II, fig. 5.

Common in many of the smaller streams of the central districts of the Western shore.

It is much esteemed in the regions where it lives, and being fried crisp with other small *Cyprinidæ* forms a very enjoyable dish of food.

It is becoming exterminated in several of the streams near Baltimore.

Acad. Coll. S. I.

ARGYREUS, Heckel.

1—A. atronasus.

Black-nosed Dace, or Brook Minnow.

Body oblong, cylindrical, tapering; head small, flattened. In summer and autumn it is brownish olive above a black band, which extends around the nose to the origin of the caudal fin, and satin white below. In spring the latter region becomes vermilion red, and the lateral band assumes an orange hue; the pectoral and ventral fins become similar to the abdomen, and the rays of the former are greatly thickened. Length, 1 to 3 inches.

Fin-rays:—D. 8; P. 15; V. 8; A. 8; C. 19.

Rhinichthys atronasus, Mitchill, Lit. & Phil. Trans. New York, I p. 460; Guenther, VII, p. 191.

Argyreus atronasus, Storer, Mem. Am. Ac. V, 1855, p. 288, pl. 21, fig. 4.

Leuciscus atronasus, DeKay, New York Fauna, Fish, p. 205, pl. 23, fig. 69.

This pretty little fish delights in the Trout streams, in their small, shallow basins. It is also common in many of the springs and streams running therefrom in the central parts of Baltimore and Carroll counties. It is a favorite for aquaria.

Acad. Coll. S. I.

2—A. nasutus.

Black Chub.

This species is larger and more elongate than the last, with a most prominent and flattened muzzle. It is of a general olivaceous color, paler below, with numerous brown dots, sometimes extending over the sides of the belly, and almost blackening the upper surface. The lateral band of the *atronasus* is never seen. The lips and parts of cheek of the males, with the paired fins and the caudal, are of a bright crimson in Spring. Length, $3\frac{1}{2}$ inches.

Fin-rays:—D. 1. 8; P. 15; V. 8; A. 1. 7; C. 19.

Leuciscus nasutus, Ayres, Boston Journ. Nat. Hist. IV, p. 2[illegible], pl. [illegible], fig. [illegible]; Storer, Mem. Amer. Acad. V, 1855, p. 289, pl. 22, fig. 1.

Rhinichthys nasutus, Agassiz, Lake Superior, Guenther, VII, p. 189.

Argyreus nasutus, Cope, Journ. Acad. Nat. Sc. Philadel., XIII, p. 369, pl. 12, fig. 5.

It lives in the small streams, chiefly in their rocky, rapid and grassy parts, but is only taken singly. Seems to belong to the clear waters of the higher levels not remote from the mountains.

Acad. Coll. S. I.

STILBE, DeKay.

S. americana.

Dace, Shiner, Chub, or Variegated Bream.

Body much depressed, deep; its depth being about one-third of the total length (without caudal). Head very small.

The upper surface of the head and back is usually blackish, the rest of body white with a greenish, brassy or golden lustre. Length, 3 to 6 inches.

Fin-rays:—1. 7; P. 16; V. 9; A. 2. 14; C. 19.

Cyprinus americanus, L. Syst. Nat. I, p. 530.

Leuciscus chrysoleucus, Storer, Rep. p. 88.

Stille chrysoleucus, DeKay, New York Fauna, Fishes, p. 204, pl. 29, fig. 91.

Abramis versicolor, DeKay, l. c. p. 191, pl. 32, fig. 103.

Leucosomus americanus, Storer, l. c. V, p. 283, pl. 21, fig. 2.

Abramis americanus, Guenther, VII, p. 305.

Acad. Coll. S. I.

CHROSOMUS, Rafinesque.

C. eos.

The height of the body of this small species is a little less than the length of the head, which is one-fourth of the total (without caudal). In the Autumn the color is silvery below, with a dark band in the usual position of the lateral line, and a narrower dark line above it, confluent with the lower on caudal peduncle. Above the lower band are small brown spots.

Fin-rays:—1. 8; P. 16; V. 8; A. 1. 8; C. 18.

Chrosomus eos, Cope, Proc. Ac. Nat. Sc. Philad., 1864, p. 281.

Phoxinus neogæus, Cope, Trans. Am. Phil. Soc. XIII, p. 375 and 391; Guenther, VII, p. 247.

In Stony Run, a tributary of the Patapsco River, with clear sandy bottom, and also in the Upper Potomac, in Washington county.

Acad. Coll. S. I.

CLINOSTOMUS, Girard.

1—C. funduloides.

The height of the body equals the length of the head, which is one-fourth of the total (without caudal). A male in breeding dress is quite rugose, like *Hypsilepis diplæmia*, with tubercles on the back, sides, and the rays of the dorsal and anal fins. Above the lateral line dusky, with a yellowish band from the head to the tail; below the lateral line yellowish, red in spring.

Fin-rays:—D. 10; P. 16; V. 8; A. 9; C. 19.

Clinostomus funduloides, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 212; Cope. Trans. Am. Phil. Soc. XIII, p. 376, pl. 13, fig. 2.

Leuciscus funduloides, Guenther, VII, p. 256.

Caught in Piney Run, Carroll county. It seems to be rather uncommon.

Acad. Coll. S. I.

2—C. margarita.

Head four times in body to base of caudal fin, equal the greatest depth. Coloration, above light olive, without dorsal line, but darker shade at origin of dorsal fin; sides plumbeous silvery, below bright crimson (in midsummer). Muzzle blackish; fins unspotted.

Fin-rays:—D. 1. 8; P. 17; V. 8; A. 1. 8; C. 19.

Clinostomus margarita, Cope, Proc. Ac. Nat. Sc. Phil. p. 377, pl. 13, fig. 1.

Leuciscus margarita, Guenther, VII, p. 246.

Three specimens from Piney Run, Carroll county. It has not yet been found in the streams near Baltimore, but is reported to be in the Potomac River, north of Washington.

Acad. Coll. S. I.

ALBURNELLUS, Girard.

A. rubellus.

This elegant little fish has a slender, compressed body, the height of which is contained six times in the total length (without caudal); the back is somewhat more convex than the tail. The back is of a yellowish-green, with the outlines of the scales black; the sides have a brilliant silvery reflection, with a more marked median band; the fins are transparent, pale yellow.

Fin-rays:—D. 1. 9; P. 11; V. 8; A. 2. 10; C. 19^{4}_{4}.

Alburnellus rubellus, Agassiz, Lake Super, p. 364, pl. 3, fig. 1—3; Cope, Proc. Ac. Nat. Sc. Philad. 1864, p. 282.

Leuciscus rubellus, Guenther, VII p. 254.

Inhabits Pipe Creek, in Carroll county, and seems to be common there. No specimens have thus far been found in the streams near Baltimore, and it is no doubt a species belonging to the mountain region.

Acad. Coll.

HYPSILEPIS, Baird.

1—H. kentuckiensis.

White-Fin.

The height of the body is contained four times in the total length, (without caudal), the length of the head four times and one-third. General color leaden silvery, darkest on the sides; the scales above and below, a dorsal band and large spot on hinder part of dorsal fin, blackish; top of head shaded with the same. The inferior fins, and even the tip of the caudal, and anterior part of the dorsal, are filled with a satin-white pigment in spring and summer, which gives the fish the name "White or Silver Fin." At the same time small tubercles appear upon the head and muzzle of the male. Length, 3 to 5 inches.

Fin-rays:—D. 8; P. 12; V. 8; A. 9; C. 22.

Leuciscus Kentuckiensis, (Rafin.) Kirtland, Bost. Journ. Nat. Hist. VI, p. 27, pl. 8, fig. 3: Storer, Mem. Am. Ac. II, p. 410; Guenther, VII, p. 251.

Hypsilepis Kentuckiensis, Cope, Trans. Am. Phil. Soc. XIII, p. 371, pl. 11, fig. 3.

Common in all our creeks beyond the reach of tide-water. It delights in the little pools between the rocks, and in the sandy basins, and attracts the observer by the delicate beauty of its silver fins in reflecting the sun-light as it turns its sides.

Acad. Coll. S. I.

2—H. cornutus.

Red-Fin, or Rough-Head.

Body cylindrical, tapering; greatest depth in front of the dorsal fin, where the back is slightly arched. Scales large. In the breeding season minute tubercles appear on the summit and the sides of the head, extending as far back as the dorsal fin. Color above dark impure blue; sides from rosy to silver-white; the scales in adults blackish at basis. Anal, ventral, and pectoral fins in males, crimson in spring and summer. Length, 5 inches.

Fin-rays:—D. 1.8; P. 1.15; V. 8; A. 1.9; C. 4.19.5.

Leuciscus cornutus, Storer, Bost. Journ. Nat. Hist. IV, p. 183; DeKay, New York Fauna, Fishes, p. 207, pl. 29, fig. 92; Guenth. VII, p. 249.

Hypsilepis cornutus, Cope, Trans. Am. Phil. Soc. N. S. XIII, p. 372.

Widely distributed in Eastern North America, in the fresh water streams, from Montreal to Virginia. In Maryland it occurs in the rivers and their tributaries, and always attracts the attention of juvenile fishermen by the bright red of its fins and head. In the spawning season, which occurs in the month of June, its body is usually suffused with a tint of rose pink, which it loses after this period is past. It has been frequently met with in large numbers in the quiet pools of mill dams.

Acad. Coll. S. I.

3—H. diplæmia.

Warty-Chub, or Red-Sides.

The height of the body is contained thrice and three-fourths in the total length (without caudal), the length of the head four times. Snout rounded, and warty in the males during the breeding season. Color dusky above, the sides and belly silvery, without band; below crimson in spring. A large black spot at base of dorsal fin. Lengh, 2 to 4 inches.

Fin-rays:—D. 1.9; P. 12; V. 8; A. 1.11; C.—18.--

Leuciscus diplemius, (Rafin.) Kirtland, Bost. Journ. Nat. Hist. V, p. 276, pl. 22, fig. 3; Guenth. VII, p. 250.

Hypsilepis, diplæmia, Cope, Trans. Am. Phil. Soc. XIII, p. 373.

Inhabits the upper Potomac, in Washington county.

Acad. Coll.

HYBOPSIS, Agassiz.

1—H.hudsonius.

Spawn-Eater.

Head and body oblong, the dorsal outline somewhat arched near the dorsal fin. The length of head somewhat more than one-fifth of the total (without caudal), the height of the body one-fourth. Nose blunt; eyes large; scales very deciduous. Yellow olive above dorsal line, with brown-edged scales; below yellowish white. No distinct spot at base of dorsal fin.—Length, 4 inches.

Fin-rays:—D. 1. 8; P. 15; V. 19; A. 1. 8; C. 19.

Leuciscus hudsonius, DeKay, Nat. Hist. New York, Fishes, p. 206, pl. 34, fig. 109; Storer Synops. p. 157; Agassiz. Lake Superior, p. 272; Guenther, VII, p. 251.

Hudsonius fluviatilis, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 210.

— *amarus*, Girard, l. c.

Hybopsis phaenna, Cope, Proc. Ac. Nat. Sc. Phil. 1864, p. 279.

— *hudsonius*, Cope, Trans. Am. Phil. Soc. XIII, p. 386, pl. 12, fig. 3.

Usually confounded with our common gudgeon, which it closely resembles. It seems to be uncommon, but a few specimens have been taken in the fresh-water part of the Patapsco River.

ACAD. COLL. S. I.

2—H. procne.

This small species may be readily distinguished by its long caudal peduncle and tail, its large brown-edged dorsal scales, and plumbeous lateral band. The height of the body is about one-fifth of the total length (without caudal), the length of the head somewhat less than one-fourth. The fins are unspotted, and a blackish line runs along the lateral line.

Fin-rays:—D. 1. 8; P. 12—13; V. 1. 8; A. 1. 7; C. 19.

Leuciscus procne, Guenther, VII, p. 260.

Hybognathus procne, Cope, Proc. Acad. Nat. Sc. Philad., 1864, p. 283.

Hybopsis procne, Cope, Journ. Ac. Sc. Philad. XIII, p. 385, pl. XI, fig. 2.

Found in the Upper Potomac and in the Canal, Washington county, by Major J. B. Ferguson.

ACAD. COLL. S. I.

HYBOGNATHUS, Girard.

H. regius.

Minnow.

Body elongated, compressed, its depth being one-fifth or rather less than one-fifth of the total length (without caudal); the length of the head is one-sixth of the total. Coloration uniform.

Fin-rays:—D. 11; A. 11.

H. regius, Girard, Proc. Ac. Nat. Sc. Philad. 1856, p. 209.

Common in the upper parts of the Patapsco River, in the Potomac, and in all the larger creeks of Baltimore county, north and west of the city.

ACAD. COLL. S. I.

LVI—SILURIDÆ.

ÆLURICHTHYS, Baird & Girard.

A. marinus.

Oceanic Cat-Fish, or Fork-Tailed Cat-Fish.

Body cylindrical, tapering behind; its greatest depth at the origin of the first dorsal, where it is one-sixth of the total length. Skin smooth. Head broad, flattened above, smooth, with a few scattering patches of granulations. Jaws equal, broad and rounded. Two flattened barbels depend from the chin, and two similar ones from the angle of the mouth. The first dorsal fin is high, triangular, with one bony and seven soft rays, the first ray rough in front, three inches high, but continued six inches further by a soft, flat filament, ending in a fine point. First pectoral fin bony, strongly dentated behind, and with a similar filament as the first dorsal fin. Small adipose fin. Blue above, tinged with green; abdomen white. Length, 1 to 2 feet.

Fin-rays:—D. 1.7; P. 1. 12; V. 6; A. 23; C. 17.

A. marinus, Guenther, V, p. 178.

Silurus marinus, Mitch. Lit. & Phil. Tran. New York, I, p. 433.

Galeichthys parræ, Cuv. & Val., XV, p. 33.

— *marinus*, DeKay, New York Fauna. Fishes, p. 178, pl. 37, fig. 118 (bad.)

Ælurichthys marinus, Girard, Ichth. U. S. & Me. Bound., pl. 14.

Enters Sinepuxent and Chesapeake Bays from the ocean; but is quite unpopular with the people of the southern counties of the Eastern Shore. It is said to have become less common than formerly.

ACAD. COLL.

NOTURUS, Rafin.

N. flavus.

Yellow Back-tail. Stone Cat-Fish.

Shape of the common Cat-Fish, but distinguished at once by having the second dorsal fin, which is very long and decurrent, connected with the tail; it has only rudiments of an immature adipose fin. Anal fin elongate, widened behind. Back and head yellowish-olive; sides yellow; nose, throat and abdomen white. Fins slightly dusky, diaphanous.—Length, 4 to 12 inches.

Fin-rays:—D. 1.7; P. 1.7; V. 8; A. 1. 7; C. 19.

Quite common in the Potomac River and Canal along the boundary of Washington county. It is also in the rocky parts of the Patapsco River, and smaller streams near Baltimore. Lives beneath the stones in the streams running through the metamorphic rocks in Baltimore county.

ACAD. COLL. S. I.

AMIURUS, Rafin.

1—A. catus.

Common Cat-Fish, or Horned Pout.

Body elongate, depressed before the anterior dorsal, compressed behind. Head flattened, smooth; a short, erect barbel at the hind margin of nostril, two thick and fleshy barbels depend from the upper jaw, and four from lower jaw. Body smooth, scaleless. Eyes small. Second dorsal fin adipose and elongated.

Pectoral fin with a stout, serrated spine, which, by an ingenious mechanism, becomes fixed and immovable at the will of the animal, and serves as an important arm of defense. Dusky, with a deeper shade on the back and summit of head. Sides of head with a greenish tint; coppery on the sides. Abdomen pearl-grey. Fins dusky, but become tinged with red after dead. Length, 7 to 12 inches.

Fin-rays:--D. 16: P. 1.8: V. 8: A. 23; C. 19.

A. catus, Guenther, V, p. 99.

Silurus catus, L. Syst. Nat. I, p. 504; Cuv. & Val., XV, p. 124, pl. 432. DeKay, New York Fauna, Fishes, p. 182, pl. 37, fig. 119: Girard, Proc. Acad. Nat. Sc., Phil. 1859, p. 160.

Brought in huge piles to the Baltimore markets, and is an abundant and cheap food for the poorer classes. Specimens from the deeper basins of the Potomac River measure sometimes as much as 18 inches in length, and are stout in proportion.

It is common in the tidewater part of the Patapsco river, but does not attain to such a large size as specimens from the Potomac.

2—A. lynn.

Channel Cat.

The head, which is longer than broad, forms a little less than the fourth of the total length. The upper jaw is somewhat longer than the lower one. The eyes are rather large, their diameter being contained seven times in the length of the side of the head, and four times and a half across the interocular space. The anterior margin of the dorsal fin is equidistant between the apex of the snout and the origin of the adipose. The posterior edge of the caudal is moderately emarginated; the fin itself constituting not quite the sixth of the total length. The upper regions are bluish-black, whilst the abdomen is whitish.

Fin-rays:—D. 1. 5. 1; P. 1. 9; V. 8; A. 20; C. 3. 1. 8. 7. 1. 4.

A. lynx, Girard, Proc. Ac. Nat. Sc. Phil., 1859, p. 160.

This occurs in the Potomac and Patapsco Rivers in the same places as *A. catus*, and near Baltimore is the joy of the poor colored people, who catch it in considerable numbers.

It does not seem to grow to such large size as the preceding.

Acad. Coll. S. I.

LVII—CONGRIDÆ.

CONGER, Cuv.

C. oceanica.

Conger Eel.

Head nearly one-eighth of the total length, pyramidal, flattened above. Lateral line distinct, and with a series of whitish punctures through its whole length. Eyes large; lips large and fleshy. The tail ends in an acute tip. Pectorals oblong, with seventeen rays. The dorsal fin is continuous with the caudal and anal. Dark olive-brown above; chin, space behind pectorals, and all beneath soiled white. Dorsal and anal of a deep black-hue along their margins. Length, 3 to 5 feet.

Fin-rays:—P. 17; D. C. & A., 539—550.

C. oceanica, Mitch. Journ. Ac. Nat. Sc. Philad., I. p. 407.

Common in the lower Potomac, and in the parts of rivers within the reach of tide. Brought to our markets in large numbers, and find a ready sale.

Acad. Coll.

LVIII—ANGUILLIDÆ.

ANGUILLA, Cuv.

A. bostoniensis.

Common Eel or Fresh-Water Eel.

Body cylindrical, compressed behind, terminating in a point. Head equal to about one-tenth the length of the body, compressed above, tapering to a blunt point at the snout. Lips fleshy; lower jaw slightly longest. Greenish, or olive-brown above; yellowish, or yellowish-white beneath; frequently with a reddish tinge along the margin of anal fin.—Length, 1 to 2 feet.

Fin-rays:—P. 16; D. C. & A., 450—460.

A. bostoniensis, Ayres, Boston Journ. Nat. Hist., IV, p. 279; Storer, Mem. Am. Acad., VIII, p. 408, pl. 33, fig. 1.

— *lutea* (Rafin.,) Kirtland, Bost. Journ. Nat. Hist., IV, p. 234, pl. 11, fig. 2.

— *tenuirostris*, DeKay, New York Faun., Fishes, p. 310, pl. 53, fig. 173.

This is the common eel of our creeks and small rivulets, being found sometimes in large numbers among the rocks at the foot of a cascade. They remain in these streams during the whole year, at least the smaller ones do.

Acad. Coll. S. I.

LIX—LEPIDOSTEIDÆ.

LEPIDOSTEUS, Lacep.

L. osseus.

Gar-Pike.

Body elongated, cylindrical, compressed towards the tail. Scales arranged in oblique series; they are smooth, thick, rhomboidal, terminating on the caudal fin in an oblique line, which is directed from above, forwards. They are of stony hardness in dried specimens, but may be cut with a knife in recent fish. Head square, rounded above, elongated; eyes large. Soiled yellowish; darker above. A broad, longitudinal band of dusky brown extends from the opercles to the tail just beneath the lateral line. Length, 1 to 3 feet.

Fin-rays:—D. 8; P. 14; V. 7; A. 10; C. 14.

L. osseus, Guenther, VIII, p. 330.

Esox osseus, L. Syst. Nat. I, p. 516; Mitch. Trans. Phil. & Lit. Soc. N. York, I, p. 444.

Lepidosteus bison, DeKay, New York Fauna, Fish, p. 271, pl. 43, fig. 139.

— *oxyurus*, Cope, Proc. Ac. Nat. Sc. Philad. 1868, p. 87; Kirtland, Report, p. 170, 196, and Boston Journ. Nat. Hist., IV, p. 16, pl. 1, fig. 1.

Common in the brackish water of the Potomac, Patapsco and some of the rivers of the Eastern Shore; not sold for food.

Acad. Coll. S. I.

LX—ACIPENSERIDÆ.

ACIPENSER, Artedi.

1—A. oxyrhynchus.

Sharp-Nosed Sturgeon.

Body elongated, pentagonal. Entire surface granulated, excepting that occupied by five longitudinal rows of flattened plates, of the same structure as the covering of the head, but of a lighter color. The largest plates form the dorsal ridge; in younger specimens these plates are compressed on the sides, and terminate above in strong, sharp, recurved spines. The head flattened above, slightly depressed between the eyes, and terminates at the occiput in a rounded plate, pointed in the immature fish. Snout blunt; eyes small; lips fleshy, bilobed; mouth on underside of head; between snout and mouth are four barbels. Greyish-brown above, silvery upon the inferior body of sides. Upper lobe of caudal twice as long as the lower. Length, 2 to 8 feet.

Fin-rays:—D. 38; P. 28; V. 24; A. 23; C. 125.

Acipenser oxyrhynchus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 462; Lesueur, Trans. Am. Phil. Soc. New Jer. I, p. 394; DeKay, New York Fauna, Fishes, p. 346, pl. 58, fig. 189; Ayres, Boston Journ. Nat. Hist. IV, p. 287; Storer, Mem. Am. Acad. II, p. 493, and VIII, p. 431, pl. 35, fig. 4.

Common in the Susquehanna and Potomac Rivers.

Sometimes, but not commonly, brought to the Baltimore markets.

Acad. Coll. S. I.

2—A. brevirostrum.

Short-Nosed Sturgeon.

Head broad and convex. Snout short, subacute, depressed between the eyes. Skin appears smooth, but is scattered over with small spines. Four flat barbels under the snout, disposed in pairs, and placed nearer the nostrils than to the end of the snout. Dorsal series of tubercles, nine to twelve lateral series, twenty-three to twenty-nine; abdominal series, from five to seven. Tail covered with lozenge-shaped plates. Dusky above, with faint traces of oblique bands; whitish, with a reddish hue below the lateral series; white beneath. Length, 2 to 5 feet.

A. brevirostrum, Lesueur, Trans. Am. Phil. Soc. I, p. 390; DeKay, New York Fauna, Fishes, p. 345.

Inhabits the Potomac River.

S. I.

LXI—MYLIOBATIDÆ.

ÆTOBATIS, Mull. & Henle.

A. narinari.

Bishop-Ray.

Form of head, body and tail very much like that of *myliobatis*; smooth. The dorsal fin situated between the ventrals. The nasal valves separate, each forming a long flap. Teeth flat, broad, forming a single series; teeth of the lower jaw sometimes angularly bent, sometimes nearly straight. The very long tail with four or five spines. Disk generally with numerous round, bluish-white spots.

A. narinari, Muller & Henle, p. 179; Guenther, VIII, p. 492.

Goniobates flagellum, Agass. Proc. Boston Soc. Nat. Hist. VI, p. 385.

Enters Chesapeake Bay from the ocean, and is caught in seines near Norfolk, Va.

S. I.

RHINOPTERA, Kuhl.

R. quadriloba.

Cow-Nosed Ray.

Body rhomboidal, elevated along the dorsal line. Pectorals acute. Tail slender, longer than the body. Muzzle divided into two short lobes, under which are two similar ones. Head distinctly projecting from the pectorals. Teeth broad and flat. Olive-brown above, beneath white. Width two feet.

R. quadriloba, Guenther, VIII, p. 494.

Raja bonasus, Mitch. Trans. Lit. & Phil. Soc. New York, 1, 1815, p. 479.

— *quadriloba*, Lesueur. Journ. Ac. Nat. Sc. Philad. I, p. 44.

Rhinoptera quadriloba, Cuv. Regne Anim.; DeKay, New York Fauna, Fishes, p. 375, pl. 66, fig. 217.

In the drains of the ocean at the entrance to Sinepuxent Bay, and near the mouth of the Chesapeake Bay.

Acad. Coll.

MYLIOBATIS, Cuv.

M. freminvillii.

Sharp-nosed Ray.

Body rhomboidal. Head prominent beyond the pectorals, which are wide. Teeth wide, flat, paved. Orbit salient, surrounded by an eminence. Ventral rounded. Tail very long, filiform, triangular, armed above with a serrated spine, and furnished with a fin. Above olivaceous; more or less deep in different specimens, paler on the margins, and sprinkled with distinct rounded spots; beneath white. Width two to three feet.

M. freminvillii, Lesueur, Journ. Ac. Nat. Sc. Philad. IV p. III.

Enters Chesapeake Bay from the ocean.

S. I.

LXII—CEPHALOPTERIDÆ.

CERATOPTERA, Mull. & Henle.

C. vampyrus.

Devil-Fish.

Body large; the transverse much exceeding its longitudinal diameter. Skin rough to the touch, but without any evident tubercles or spines. Head not distinct from the body, subtruncate in front, slightly convex. Mouth with very small teeth in seven or eight rows. Eyes prominent, lateral, four feet apart. Tail long, longer than body, slender, compressed, terminating in a slender extremity, and armed with one or more spines. Dorsal fin small, triangular, with thirty-six rays, placed over the base of the tail between ventrals. Pectorals much elongated, arched in front, concave behind, projecting on each side of the mouth, and used as instruments of prehension. Ventrals broad, sharp, deeply emarginated and rounded behind; continuous in front with the pectorals. Blue-black above; dusky, varied with large, opaque, white clouds, beneath. Length to base of tail, 10 feet; to the end of tail, 16 feet; width across the tips of the pectorals, 17 feet.

C. vampyrus, Guenther, VIII p. 498.

Cephalopterus vampyrus, Mitchill, Ann. Lyc. Nat. Hist. New York, 1823, I p. 23, pl. 2, fig. 1; DeKay, New York Fauna, Fishes, p. 377, pl. 67, fig. 219.

— *giorna*, Lesueur, Journ. Ac. Nat, Sc. Philad. IV, p. 115, pl. 6.

Ceratoptera vampirus, Dumeril, Elasmobr. p. 660.

This huge monster of the deep is found in the drains of the ocean, near Sinepuxent Bay, and occasional near the entrance to Chesapeake Bay.

LXIII—TRYGONIDÆ.

PTEROPLATEA, Muller & Henle.

P. maclura.

Broad Sting-Ray, or Butterfly Ray.

Body oval, elliptical, broader than long; snout blunt, not produced beyond the lateral margins of pectoral fins, but contiguous with them. Surface rough; eyes small, near the snout; mouth with minute, triangular, sharp teeth, each emarginated at base to receive the hind teeth. Ventral fins short, broad and rounded. Tail short, one-third as long as body, triangular, with one or two spines near the base. Above greenish-blue, with small, black, vermicular, interrupted lines, and larger, distant, pale spots; beneath pale red; length 15 to 18 feet.

P. maclura, l. c. p. 169.

Raja maclura, Lesueur, Journ. Ac. Nat. Sc. Philad. I p. 41.

Pastinaca maclura, DeKay, New York Fauna, Fishes, p. 375, pl. 65, fig. 213.

Occasional on the coast of Worcester county.

S. I.

TRYGON, Adanson.

T. centrura.

The Stingaree.

Body quadrilateral, rounded on the pectoral angles; its transverse and longitudinal diameter nearly equal. Snout pointed; teeth small, flat, lozenge-shaped. Upper surface of body smooth, covered with dark slime. Tail longer than body, cylindrical, rough, tapering and flexible towards the end; armed with two or more small, flattened, pointed and teethed spines. Above uniform olive-brown; beneath white. Length of body and tail 5 to 8 feet.

T. centrura, Mitch.

Common on the ocean coast of Worcester county and around the entrance to Chesapeake Bay.

Acad. Coll. S. I.

LXIV—TORPEDINIDÆ.

TORPEDO, Dumeril.

1—T. occidentalis.

Torpedo or Cramp-Fish.

Disk of body nearly circular; pectoral fins large; two dorsal fins placed so far back as to be on the tail; surface of body smooth; tail short and rather thick; teeth sharp and small. Very broad across pectorals, which are rather less than half the entire length; caudal fin nearly triangular, straight at its posterior margin. Eyes very small. Whole upper surface dark brown, with a few, almost black, dots distributed over it; beneath white. Length 4 feet 2 inches: width 3 feet.

T. occidentalis, Storer, Mem. Am. Ac. II, p. 576, IX, 1867, p. 247, pl. 39, fig. 15, and Proc. Bost. Soc. Nat. Hist. II, p. 7.

Said to occur very rarely in the region near the entrance to Chesapeake Bay, and comes from the ocean.

LXV—RAJAIDÆ.

RAJA, Artedi.

R. eglanteria.

Prickly Skate, or Clear-Nosed Ray.

Body flat, semiorbicular behind, with a wide, rounded emargination each side before, near the spiracles, anterior to which the edge is dilated opposite to the eyes, and then is contracted so as to form a short, rounded rostrum. A longitudinal series of from nine to twelve simple spines on each side upon the pectorals; tail longer than the body, with two fins at its tip. Above reddish, sprinkled with small spots; beneath whitish, with reddish tints. Length 15—19 inches; width 7 to 10 inches.

R. eglanteria, Lacep. II, pp. 103. 109, tab. 4, fig. 2; Lesueur, Journ. Ac. Nat. Sc. Philad. IV, p. 103, pl. 6; Storer, Mem. Am. Ac. II, p. 512.

Rather uncommon, mostly taken in spring, and occasionally eaten, but not prized as an article of food. Belongs to the ocean and around the mouth of Chesapeake Bay.

2—R. erinaceus.

Summer Skate.

Form rounded. Snout pointed. Head somewhat distinct from body, with rounded cheeks, upon which are prickles; eyes large, oblique. Surface smooth, with several groups of prickles arranged in regular series. A triangular group of prickles on the back; two rows each of about twenty erectile ones, on the pectoral fins: a double dorsal series, extending along the whole length of the tail, where they are stout and stiff. Beneath smooth. Two triangular dorsal fins near extremity of tail. Pectorals broad and rounded: ventrals two-lobed, deeply emarginated. Tail nine inches long, smooth on all sides, except the double lines of spines described. Male appendages cylindrical. Length 17 inches. Pale brown above, with numerous dark brown spots; paler beneath.

R. erinaceus, Mitch. in Sillim. Journ. 1825, IX, p. 290, pl. 6, (copied by DeKay, New York Fauna, Fishes, p. 372, pl. 78, fig. 246); Storer, Mem. Am. Acad. II, p. 511.

Found on the ocean coast of Worcester county.

3—R. lævis.

Smooth Skate, or Barn-Door Skate.

Form rhomboidal. Small spines on the orbits, and anterior margins of pectoral fins; rest of body smooth. Three rows of spines on tail. Snout blunted. Length of head to entire length nearly one to four. In the *male*, the under surface of the snout and exterior of the nostrils to the angle of the jaws, roughened by innumerable minute tubercles. *Male* of uniform light-brown color. *Female* with blackish ocelli. Length 2 to 5 feet.

R. lævis, Mitch. Amer. Monthl. Mag. 1818, p. 327; DeKay, New York Fauna, Fishes, p. 370; Storer, Mem. Amer. Acad. IX, 1867, p. 242, pl. 39, fig. 2.

Raja batis, Storer, Report, p. 193.

Not uncommon in the ocean on the coast of Worcester county, but said to be scarce in the Chesapeake Bay.

S. I.

LXVI—PRISTIDÆ.

PRISTIS, Latham.

P. antiquorum.

The Saw-Fish.

As once distinguished by its very long, depressed muzzle, in the form of a sword, armed on each side with strong, bony spines, pointed and implanted like teeth (24 on each side). The mouth is under the head, and contains the true teeth, which are small and rounded. This fish unites to the elongated form of the sharks a body, flat in front, and gills, pierced beneath, as in the Rays or Skates. The skin is finely shagreened. Dusky above, pale grey beneath. Length 12 to 15 feet, including the saw.

P. antiquorum, Latham, Trans. Linn. Soc. 1794, II, p. 277, pl. 26, fig. 1.

Occurs in the ocean off our coast, but occasionally enters Chesapeake Bay.

Acad. Coll.

LXVII—LAMNIDÆ.

CARCHARODON, Muller & Henle.

C. atwoodi.

The Man-Eater.

Body very short anterior to the ventral fins. Pectorals large. Anal back of second dorsal. Teeth in both jaws, triangular, serrated; those of the lower jaw the smaller. About twenty-four teeth in each row. Above leaden grey; white beneath. Nearly 13 feet in length.

Carcharias atwoodi, Storer, Proc. Bost. Soc. Nat. Hist. III, 1848, p. 71.

Carcharodon atwoodi, Gill, Proc. Ac. Nat. Sc. Philad. 1864, p. 260.

Enters Chesapeake Bay and roams over its entire length. It proceeds sometimes as far as to the outer harbor of Baltimore, and is generally the terror of bathers in the Patapsco River.

LXVIII—ALOPECIIDÆ.

ALOPIAS, Mull. & Henle.

A. vulpes.

Thresher Shark.

Body cylindrical; thickest before the dorsal fin, with a ridge on its upper surface towards the tail, and a deep cavity at the base of caudal fin. Back regularly arched from above the pectorals to the end of the snout, which is blunt. Skin roughened with minute prickles, which are directed backwards, and obvious to the touch. Mouth in shape of a horseshoe, with three rows of distant, flat, triangular, smooth-edged teeth in each jaw. Upper lobe of the tail nearly as long as the body. Length 12 to 15 feet. Slate-blue above; beneath soiled white, marked with obsolete bluish spots upon the outer edges of the abdomen. Pupils a longitudinal slit.

The flexible tail is its principal arm of defence, it literally threshes its enemy.

A. vulpes, Guenther VIII, p. 393.

Squalus vulpes, Gm. L. Syst. Nat. I, p 1496; Mitch. in Phil. & Lit. Trans. N. York, I, p. 482.

Carcharias vulpes, Cuv. Regne. Anim; DeKay, New York Fauna Fishes, p. 348, pl. 61, fig. 199.

Alopias vulpes, Storer, Mem. Am. Ac. II, p. 505.

Common in the ocean off Worcester county, it frequently takes hooks baited for other fish.

LXIX—GALEORHINIDÆ.

EULAMIA. Mull. & Henle.

E. milberti.

Blue Shark.

Body cylindrical, deepest in front of the first dorsal fin. Surface covered with minute, distant and oblong scales, fluted longitudinally, so as to be sensibly rough. Eyes large; nose blunt, conical; teeth in several series, small, triangular, serrate. Pectorals broad. Length two to six feet. Slate-blue on the upper part of head, body and superior fins; the same color, but lighter, extends over the upper part of pectoral and ventral fins. All beneath whitish.

Squalus cœruleus, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 487.

Carcharias cœruleus, DeKay, New York Fauna, Fishes, p. 349, pl. 61, fig. 200; Guenther, VIII, p. 363.

Lamna caudata, DeKay, l. c. p. 354, pl. 62, fig. 205.

Carcharias, (*Prionodon*), *milberti*, M. & H. p. 38, pl. 19, fig. 3, (teeth).

Eulamia milberti, Gill, Proc. Ac. Nat. Sc. Philad. 1864, p. 262.

Quite common on the coast of Worcester county, and in the drains emptying into the ocean.

Acad. Coll.

GALEOCERDO, Muller & Henle.

G. tigrinus.

Tiger Shark.

Body cylindrical, with a moderate flat snout; caudal elongated; last two branchial apertures above the pectorals; anal fin, with the anterior lobe little produced and rounded. Distinguished at once by its spotted body.

G. tigrinus, Muller & Henle, p. 59, pl. 23; Gill, Proc. Ac. Nat. Sc. Phil. 1864, p. 263.

— *maculatus*, Poey, Report Fish Nat. Cuba, 1868, p. 453.

Sometimes enters Chesapeake Bay, and is also on the ocean coast of Worcester county.

MUSTELUS, Cuv.

M. canis.

Smooth Dog-Fish.

The slender body is cylindrical, tapering, elongated. Head flattened above; snout thin, obtusely pointed. Surface of body rough. Mouth crescent-shaped when opened, triangular when closed. Teeth on the jaws, smooth, flattened, rhomboidal, distributed in about ten rows. Both dorsal fin similar in shape; caudal fin bilobed. Length 2 to 4 feet. Uniform dull ashen-grey; white beneath. Upper edges of dorsals and anal bordered with black; ventrals and anals opaque white; lower lobes of caudal bordered with white or greyish.

M. canis, Storer, Amer. Acad. IX, 1867, p. 227, pl. 37, fig. 2; DeKay, New York Fauna, Fishes, p. 355, pl. 64, fig. 209.

Very common on the coast of Worcester county and on the southern shores of the Eastern peninsula.

Acad. Coll. S. 1.

LXX—SPINACIDÆ.

SQUALUS, Artedi.

S. americanus.

The Spiked Dog-Fish.

Rather more robust than the "Smooth Dog-fish," with a shorter muzzle. It has two dorsal fins, with a spine before each. The skin is rough, with the asperities directed backwards. The scales heart-shaped, with a central spine directed backwards. The mouth is furnished with several rows of teeth in both jaws, cutting and sharp, the points directed outwards and backwards. All the upper part of the body is of a slate color, which is deeper upon the head and lighter below the lateral line; beneath white. Mr. Storer mentions a row of circular, white spots just under the anterior portion of the lateral line, and a few similar spots upon the back: they are certainly a rare exception. Upper lobe of the caudal fin broad, and as long again as the lower portion. Length. 1 to 3 feet.

Squalus americanus, Gill.

Acanthias americanus, Storer, Synopsis p. 506.

Occasional near the mouth of Chesapeake Bay and in the ocean adjacent.

LXXI—PETROMYZONTIDÆ.

PETROMYZON. Artedi.

P. americanus,

The American Sea-Lamprey or Lamprey-Eel.

Bluish brown, mottled with black olive-green, which is the general color along the back; beneath silvery grey; first dorsal fin greenish; the second reddish; tail dark brown.

Body cylindrical anteriorly, compressed posteriorly, and terminating in an acute tip; a slight keel upon the back.—Head depressed, and when the mouth is closed, obtusely conic: a singular tubular orifice equidistant from, and slightly anterior to the eyes. Mouth forming a longitudinal fissure, and when attached to any object assumes the form of a regular circle. Teeth of various kinds, which may be considered as disposed in concentric circles about a common centre: in the throat, and partly closing it, are three large teeth.—Length, 20 to 30 inches.

Fin-rays:—D. 80. 90; C. 80.

— *americanus,* Lesueur, Trans. Am. Phil. Soc. 1 p, 383; DeKay, New York Fauna, Fishes, p. 379, pl. 66, fig. 216; Storer, Mem. Am. Acad. IX, p. 251, pl. 28, fig. 4.

Common in the lower part of the Potomac River, and even found in the fresher waters of that river, beyond the reach of tide. Occasionally occurs in the Gunpowder and Back Rivers. The young ones run long distances up our stony creeks and branches many miles from brackish waters.

Acad. Coll. S. I.

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Public General Laws

ON

FISH AND FISHERIES.

FISH AND FISHERIES.

PUBLIC GENERAL LAWS. ART. 41.

HEAD OF BAY.

None save resident citizens.

Sec. 1. No person except resident citizens of this State, shall fix, set or stake out any set of gill-nets, either stationary or floating, or any device whatever, for the taking of Herring and Shad in the Chesapeake Bay, at any time between the first of March and the first of June in each year, and any person so offending shall forfeit the vessel and tackle used in such fishing, and all the nets, apparatus and devices for taking fish, and also pay a fine of fifty dollars for each offence.

Forfeiture.

Laws 1868, *Chap.* 421, *Sec.* 2. *This Act repeals Sec.* 2, *Art.* 41, *Code of Public General Laws and re-enacts the same as in the text.*

Shall only use market seines.

Sec. 2. No person shall, from the tenth day of June until the thirty-first of July, in each year, fish by gill-net or hauling seine, within the waters of the Chesapeake Bay, lying within the bounds of Cecil, Kent and Harford counties, or any of its tributaries within said counties, unless with seines usually called market seines, which are used for catching summer fish; nor shall any person except resident citizens of this State, or the owners or tenants of lands or shores bordering on any of said waters so lying within said counties, fish by gill-net, hauling seine, or any device whatever, within the aforesaid waters, at any period of the year, unless by permission of the owners or tenants of the lands or shores aforesaid; and any person violating and offending against either provision of this section shall forfeit the boats, nets and seine, or other fixtures used by such offender at the time of so violating the same.

Forfeiture.

Shall not fix stakes above Poole's Island.

Sec. 3. No person shall place in the head waters of the Chesapeake Bay, or in the Sassafras, Elk, Bohemia, North East or Susquehanna Rivers, or in any of their tributaries, any stakes, piles or other thing for the purpose of attaching seines or nets thereto, with a view of taking Shad or fish of any description; this not to apply to any portion of said Bay below Poole's Island.

Sec. 4 *is repealed by Chapter* 190, *Laws* 1872.

Sec. 5. Any person violating either of the two preceding sections, shall forfeit the seine or nets attached as aforesaid, and the boats and materials used for fishing the seine, and shall also for each offence pay a fine of fifty dollars.

No vessel shall anchor.

Sec. 6. No vessel, float of timber or plank, or of any other materials, or of any description or kind whatsoever, nor any boat of any description, unless compelled to do so, by stress of weather, or other unavoidable accident, shall be anchored or stayed in any fishery in the Susquehanna River, or at the head of the Chesapeake Bay, at any time between the first day of April, and twentieth day of May, in any year, and remain thus anchored for the space of half an hour, when the weather will admit of the departure of such vessel, float or boat, after being ordered to depart therefrom by the owner or occupier of such fishery; the usual haul of a seine from any floating battery anchored between Spesutia Island, and Point Concord in the Chesapeake Bay, for the purpose of fishing, shall be to all intents and purposes considered as a fishery within the meaning of this section.

Fine.

Sec. 7. Any person violating the preceding section shall pay a fine of twenty dollars for each offence, and every hour the vessel or other obstruction continues after the half hour mentioned in the preceding section shall be considered a new and saparate offence.

Skipper shall pay fine.

Sec. 8. The skipper, the captain, owner or occupier of the vessel, float or boat referred to in the two preceding sections, shall be liable to pay said fine, and the vessel, float or boat so anchored or stayed as above mentioned, shall also be liable to be seized and sold to pay any fines imposed under the preceding section.

Shall have damages.

Sec. 9. If any such vessel, float or boat shall be willingly, wantonly and maliciously, or from gross negligence, sailed through any seine extended in any of said fisheries, the skipper, captain or other person commanding such vessel, float or boat, shall pay to the owner or occupier of such seine, such damages as shall be ascertained by two respectable and disinterested men mutually chosen by the parties, or if the parties cannot agree upon persons aforesaid, to ascertain the damages, then any Justice of the Peace, on application of either of the parties, shall appoint three disinterested persons with power to any two of the three to ascertain such damages, and any Justice of the Peace of the county where such ascertainment of damages may be made, may enter judgment thereon against the captain or person having charge of such vessel, float or boat, if the sum does not exceed one hundred dollars, and issue execution thereon, as on other judgments; and if the damages exceed one hundred dollars, then the party injured may have an action on said ascertainment of damages in the same manner as if it were an award; and in all cases the damages so ascertained, shall be a lien on such vessel, float or boat.

If over one hundred dollars.

Lien.

Sec. 10. No float or other device for fishing shall be anchored or located at any place so as to interfere with any shore fishery now used as such, or which may hereafter be established, nor shall any seine be hauled from such float or other device over the ground usually hauled over by any shore fishery, and any person violating this section, shall, for each offence, pay a fine of twenty-five dollars, and for every hour such float or other device shall remain thus anchored or located after notice shall be given by the owner or occupier of such shore fishery requiring him to remove, he shall pay an addional fine of twenty-five dollars.

Shall not anchor so as to interfere with shore fishery.

Fine.

Sec. 11. If any person shall wilfully and maliciously put any stake, log, stone or other obstruction in the usual haul of any floating battery, he shall pay a fine of twenty dollars.

Fine for obstructing haul of floating battery.

POTOMAC.

Laws 1870, *Chapter* 205, *Section* 12. *This Act repeals Section* 12, *Article* 41, *Code of Public General Laws, and re-enacts the same as below.*

Begin and end.

Sec. 12. The fishing season for Shad and Herring in the waters of the Potomac River shall begin the 15th day of March and end the first day of June in each year.

None save market seine.

Sec. 13. If any person shall haul, drift, anchor or stake in the Potomac River, or any of its tributaries in this State, any gill-nets or seine of any description, (except those commonly called market seines for summer and winter fish, and Sturgeon nets with eight inches mesh,) at any time not within the period fixed by the preceding section, he will forfeit all the boats, seines and fixtures then in his possession, and be fined for each offence, not less than fifty, nor more than one hundred dollars.

Forfeiture and fine.

Section 14 *amended by Laws* 1870, *Chapter* 206, *as follows:*

When to fish.

Sec. 14. No person shall haul, drift or fish any seine or gill-net within the water bounds, or berths of any regularly hauled fishing landing, nor opposite to any part of the shore of the owner or occupier of any such landing, within hauling distance from such shore, between the fifteenth day of March, and first day of June in each year, without the permission of the owner or occupier of such fishing landing, and any person so offending, shall be subject to the forfeiture and fine prescribed by the next preceding section.

Consent of owners.

Sec. 15. The owner or occupiers of the regularly hauled fishing landings are authorized to render any Sheriff or other officer assistance necessary to arrest any person violating any of the provisions of the two preceding sections; and the said officer shall seize all boats, seines, and fixtures in possession of such person, and carry the person so arrested before some Justice of the Peace, to be dealt with as herein directed; and the said officer may summons the posse comitatus to aid him in making arrest or seizure authorized by this article,

Owners shall aid Sheriff.

and may for that purpose also press, at the expense of the State, any steamboat or other vessel belonging to any citizen of this State not actually engaged in carrying the United States mail.

Section 16 *is repealed by Chapter* 72, *Laws of* 1872.

Sec. 17. If any person shall, during the months mentioned in the preceding section, place any boat, vessel or other obstruction or hindrance in the way of laying out or hauling any seine used in any lawful fishery on said river or its tributaries, or otherwise obstruct or hinder such laying out or hauling, and he or his agents shall fail or refuse forthwith to remove such obstruction or hindrance on being required to do so by the person so obstructed or hindered, he shall pay a fine of not less than twenty nor more than one hundred dollars.

Hindering fishing.

Fine.

Sec. 18. If any person shall wilfully and maliciously place any obstruction or hindrance in the way of laying out or hauling in any seine, in any lawful fishery upon the Potomac River, or its tributaries, or in any other manner or way prevent a *bona fide* owner of a shore, or his agent or tenant, from using or fishing such shore, he shall, on conviction, forfeit and pay not less than fifty dollars, nor more than five hundred dollars, or be imprisoned for not less than one month, nor more than one year; this and the preceding section not to apply to any obstruction or hindrance by unavoidable accident or stress of weather.

Malicious obstruction.

Forfeiture.

Sec. 19. Any owner or occupier of a fishery on the Potomac may cause and permit all vessels employed by him in carrying on his business to be anchored or moved opposite his shore, but not so as to interfere with the rights of the owners or occupiers of adjoining shores in laying out their seines.

Owner of fishery may allow vessel to anchor.

Sec. 20, *Art.* 41, *Code of Public General Laws, is repealed by Chapter* 292, *Laws* 1872.

Sub-Sec. 1. *And be it further enacted*, That sub-section one, of the Code of Public General Laws, title "Fish and Fisheries," sub-title "Potomac," be and the same is hereby repealed, and re-enacted so as to read as follows:

Re-enacted.

Not to catch fish without license.

Sub-Sec. 1. No person shall fish in the Potomac River or its tributaries, for Shad and Herring during the season herein prescribed, with seines, gill-nets or nets of any kind, without having first obtained a license therefor, as hereinafter provided; and no person shall be entitled to obtain such license for fishing with a hauling seine who is not the owner or occupier of some fishing shore on said river, nor shall any be entitled to obtain such license for fishing with gill-nets, except *bona fide* citizens of the counties bordering on said river.

Not entitled to license.

This Act repeals sub-section 1 of Chapter 205, Laws of 1870, and re-enacts the same as in the text.

How to obtain license.

Sub-Sec. 2. All persons entitled under the laws of this State to fish for Shad and Herring in the Potomac River and its tributaries, shall first obtain a license therefor, by application to the Clerk of the Circuit Court for the county bordering on said river opposite to, or in which he may desire to fish, which license shall have effect for, and during the period hereinbefore fixed; and the Comptroller of the Treasury shall cause to be printed and delivered to the several Clerks of the Circuit Courts for the counties bordering on said river, the requisite number of such blank licenses, and take their receipts for the same as for other licenses furnished; and said Clerks shall, on the first Monday in June in each year, return to the said Comptroller a list and account of such licenses issued by them.

Treasurer to furnish blank license.

Return to Comptroller.

Sub-Sec. 3. Every license to fish, as aforesaid, shall state the name and residence of the person to whom the same is granted, the description of the fishing fix to be used, whether hauling seine or gill-net; the number of square fathoms of seine or net when rigged, and that he is the *bona fide* owner of the same, and every person to whom such license may be granted, shall first pay to the Clerk where granted, three cents for each square fathom of seine, and one cent for each square fathom of gill-net to be used; but no license shall be granted to any one applying for the same, unless such applicant shall make oath before the Clerk authorized to issue the same, or before some Justice of the Peace of the same county, upon

Name and residence.

whose certificate the Clerk may issue said license, that the number of square fathoms of the seine or net to be used, and the other facts to be inserted in said license are strictly true, and that he or they will obey and comply with all the provisions of the laws of this State regulating fishing in the Potomac River, and for each and every outfit, whether of hauling seine or gill-net, a license shall be required.

Size of seine.

Sub-Sec. 4. If any person shall fish for Shad or Herring in the Potomac River, or its tributaries aforesaid, without having first obtained a license, as required in the preceding Sections of this Article, except fish caught for private use, and not for sale, he shall, upon conviction thereof, be fined not less than twenty, nor more than one hundred dollars, for the first offence, and for any second or subsequent offence be so fined, or in the discretion of the Justice, or Court before whom tried, forfeit the seine, or net, boat and other outfit used in such fishing; or both fined, and subject to the forfeiture aforesaid; one-half of such fine to be paid to the informer, and the residue to the Comptroller of the Treasury.

Fishing without license.

Fine.

Sub-Sec. 5. Every person to whom such license shall be granted, shall also be required to put the number of his license on each bow of his seine or gilling boat, outside, between the waterline and gunwale, to be painted with red oil paint on a white space, and each figure to be not less than three inches in height, and of proportionate width, and any one violating or refusing to comply with this provision, shall on conviction thereof before a Justice of the Peace of the county, in or opposite to which he may be fishing, pay a fine of not less than ten dollars, one-half to be paid the informer, and the residue to the Comptroller of the Treasury.

Number of license to be placed on the boat.

Sub-Sec. 6. Upon information given upon oath to any Justice of the Peace having jurisdiction, of any violation of any of the provisions of this Article, he shall issue his warrant for the arrest of the offender, or offenders, and for the seizure of the seines, nets, boats and other fishing outfit in cases when forfeiture of the same is provided which shall be directed to the Sheriff, or any Constable of the county, or other officer authorized to arrest under this Article, to be dealt with according to

Without warrant.

law. And it shall be the duty of any Sheriff, Constable, or other officer so authorized under said Article, with or without warrant, to arrest any person or persons violating the provisions of this Article, and to seize any such seine, net, boat or other fishing outfit, in cases where forfeiture of the same is provided, and found being used in violating any of said provisions, and to bring such offender or offenders before a Justice of the Peace most accessible or convenient, to be dealt with as herein provided.

Sold by Sheriff.

Sub-Sec. 7. All vessels or other property condemned under the provisions of this Article, shall be sold by the Sheriff, or other officer, making the seizure, on ten days' notice, and the proceeds of sale, after deducting the expenses thereof, shall be paid over to the Clerk of the Circuit Court of the county, to be disposed of as herein provided.

Fines paid into Treasury.

Sub-Sec. 8. All money arising from the sale of licenses, or from fines, penalties and forfeitures imposed under this Article, shall by the Comptroller be paid into the Treasury, and placed to the credit of the Oyster Fund, and the State's portions of such fines and forfeitures shall be paid by the Sheriff or other officer collecting the same, to the Clerk of the Circuit Court of the county where the same may accrue, and such Clerk shall account for the same to the Comptroller of the Treasury in his annual return; and the commanding officer of the "State Oyster Police Force" is hereby charged with the enforcement of the provisions of this Article; and it shall be his duty to enforce the same, as provided in sections twenty-one, twenty-two and twenty-three of the Act of Assembly of eighteen hundred and sixty-eight, Chapter four hundred and six, in regard to Oysters; and the Commissioners of the State Oyster Police Force are hereby constituted also Commissioners of Fisheries in the Potomac River.

Duty of Oyster Police Force.

Not to fish in Potomac river

Sub-Sec. 9. It shall be unlawful hereafter for any person or persons to fish in the Potomac River from what are known as "Arks or Lighters," or from any kind of vessel or float, by whatever name called, in or upon which such persons may live, or may exclusively occupy, but all such fishing shall be with or from regular seine or gilling boats. Any violation of this section shall subject the offender or offenders, upon conviction thereof, to a fine of not less than twenty nor more than one hundred dollars for the first offence, and for any second or subsequent offence to such fine, and also in the discretion of the Justice of the Peace, or of the Court before whom the offender may be convicted, to forfeiture of such ark, lighter, vessel or float, and fishing outfit, used in such violation thereof.

State of Virginia.

Sub-Sec. 10. In case the State of Virginia shall adopt a law similar in its provisions to this Act, citizens of either State, when arrested for the violation of the provisions of this Article by the police force or other officer of either State, shall be delivered up for trial to the police force, or other officer of the State of which the offender is a citizen, unless arrested for hindrance or disturbance of the fisheries on the shores of the other State, in violation of any of the provisions of this Article, in which case he shall be tried in such other State, and in all questions of citizenship the burden of proof shall be on the offender.

Laws 1865, *Chapter* 185, *Section* 21. *This Act repeals Section* 21, *Article* 41, *Code Public General Laws and re-enacts the same as given in the text.*

Not lawful to carry away sand, gravel, &c.

Sec. 21. It shall not be lawful for any person other than the owner, or by the permission of the owner, to take or carry away from any shore of the Potomac River, below Fort Washington, which has been or may be used as a fishery, any sand, gravel or other matter, that may form a part of said shore, to the amount of twenty bushels or more, and if any person shall feloniously steal, take or carry from any shore of the Potomac River, below Fort Washington, which has been or may be used as a fishery, any sand, or gravel or other matter that may form part of said shore, to the amount of twenty bushels or more, such person shall be deemed guilty of larceny, and on conviction thereof in the Circuit Court of the county in which such larceny was committed, shall pay to the owner the full value thereof, and be sentenced to the Penitentiary for not less than one year, nor more than five years.

PATUXENT.

Laws 1874, *Chap.* 219. *This Act repeals Chap.* 128, *Laws* 1872, *which repealed Sec.* 22, *Art.* 41, *Code Public General Laws, and re-enacts the same with the sub-sections, as given in the Text.*

Not be lawful.

Proviso.

Sec. 22. It shall not be lawful for any person or persons other than *bona fide* residents, citizens of Prince George's, Charles, St. Mary's and Calvert counties, to take or catch fish in the waters of the Patuxent River and tributaries, with a seine, weir, trap or other device, excepting only the hook and line; *provided*, that the provisions of this section shall not apply to such as shall obtain permission from the owners of lands bordering on said waters, to fish off and opposite his, her or their land or lands so bordering on said waters; and provided, that none other than *bona fide* residents, citizens of said counties, shall use in any of the waters of said river that bind on Prince George, Charles and Calvert counties, above the village known as Benedict, any seine, weir of not more than seventy fathoms long, and less than two inches square in the mesh.

Smaller fish to be returned to the water.

Sub-sec. 1. It shall not be lawful for any person or persons to empty their seines upon the beach, so as to leave the smaller fish to perish, but to empty the same in water of sufficient depth, to enable such smaller fish to return to the waters for growth and maturation.

Fine.

Seizure.

Sub-sec. 2. Any person or persons violating the provisions of this Act, shall be fined not less than twenty-five nor more than one hundred dollars, in the discretion of the Justice of the Peace before whom the case is heard, which amount shall be appropriated to the Public School fund of the county wherein such judgment is rendered; and for the payment of the amount of fine so adjudged, any any boat, seine, weir or other fishing tackle used by any person or persons in violation of the provisions of this Act, shall be seized and held as security upon complaint against such offending party.

Laws 1874, *Chap.* 313. *This Act repeals Sec.* 23, *Code Public General Laws, and re-enacts the same as given in the Text.*

Sec. 23. No person shall stake down any seine or net across the Patuxent River, for the purpose of taking shad or herring; nor shall any person whip, thrash or beat the water of the Patuxent River with poles or any other instruments, for the purpose of driving fish into any seine or net; nor shall any person in fishing in the said river, between the fifth day of March and the fifteenth day of May, use any seine or net with meshes of less size than one and three-eighths of an inch square; or during the rest of the year with any seine or net with meshes of a less size than two inches square, and no person shall empty any seine except in water twelve inches deep; and any person violating this section shall be subject to the fine and forfeitures provided in the twenty-second section of this Article.

Size of seine.

Laws 1874, *Chapter* 80, *add the following sections:*

Sec. 23, A. *Be it enacted by the General Assembly of Maryland,* That no vessel, float, raft or boat of any description, unless compelled to do so by stress of weather or other unavoidable accident, shall be anchored or stayed in the berth or haul of any regularly hauled fishing shore in the Patuxent River, and remain thus anchored for the space of half an hour, when the weather will permit the departure of such vessel, raft, float or boat, after being warned to depart therefrom by the owner or occupant of said fishery.

Not to anchor.

Sec. 23, B. *And be it enacted,* That any person violating the preceding section, shall pay to the owner of said fishery a fine of twenty dollars for each offence, and every hour the vessel, float or boat continues after the half hour mentioned in the preceding section, shall be considered a new and separate offence.

Penalty for violating.

Sec. 23, C. *And be it enacted,* That the captain or owner of the vessel, float or boat referred to in the two preceding sections, shall be liable to pay said fine, and the vessel, float or boat so anchored and stayed as above mentioned, shall also be liable to be seized and sold to pay any fines imposed under the preceding sections.

Liable.

Sec. 23, D. *And be it enacted,* That if any such vessel, float or boat shall be willingly, wantonly and maliciously, or from gross negligence sailed through any seine extended in any of said fisheries

Not to through.

the skipper, captain or other person commanding such vessel, float or boat, shall pay to the owner or holder of such seine, not less than twenty, nor more than one hundred dollars, at the discretion of the Justice of the Peace trying the case.

Not to obstruct.

Sec. 23, E. *And be it enacted,* That if any person shall wilfully and maliciously put any stake, log, stone, ballast or other obstruction in the berth or haul of any fishery, he shall pay a fine of not less than twenty, nor more than one hundred dollars, at the discretion of the Justice of the Peace trying the case.

Laws 1870, *Chapter* 235, *enact the following sections:*

Stationary weir may be abated.

Sec. 1. *Be it enacted by the General Assembly of Maryland,* That all stationary or permanent weirs or hedges in the Western Branch of the Patuxent River, or on the Eastern Branch of the Potomac River, and its tributaries, in Prince George's county, are declared nuisances, and may be abated as such by any person.

Forfeiture.

Sec. 2. *And be it enacted,* That if any person shall place or make any stationary or permanent weir or hedge in the said branches, or their tributaries, contrary to the provisions of the preceding section, he shall forfeit the sum of twenty-five dollars, to be recovered before any Justice of the Peace of said county, one-half to the informer or person who may sue for the same, the other half to be paid to the Justice of the Peace, and by him paid to the School Commissioners of said county for the use of the Public Schools.

Forfeiture.

Sec. 3. *And be it enacted,* That if any person shall fish any such weir or hedge, he shall for every offence, forfeit the sum of fifteen dollars, to be recovered and applied as in the preceding section.

RIVERS IN TALBOT, DORCHESTER AND CAROLINE COUNTIES.

None save residents.

Sec. 24. No person shall take or catch fish in the waters of Talbot, Dorchester or Caroline counties, except the citizens of said counties, and except such residents of this State as may obtain the permission of the owner or occupier of land bordering on any of the said waters; *provided*, that any person so obtaining permission shall not employ in his service any other than a *bona fide* resident of this State.

Sec. 25. Any person violating the preceding section, shall pay a fine of not less than five nor more than fifty dollars, and forfeit the boat or vessel in his possession, together with the seine, tackle, and all things on board at the time the offence may be committed.

Forfeiture.

WYE RIVER, AND THE RIVERS IN QUEEN ANNE'S AND KENT COUNTIES.

Sec. 26. If any person shall haul a seine in Wye River, or any of the rivers of Queen Anne's or Kent counties, without the permission of the owner or occupant of the shore where such seine may be hauled, such owner or occupant may seize by way of distress the seine, boat, tackle and everything on board the boat, and may have the damages sustained by him, by reason of such hauling of a seine, ascertained by a Justice of the Peace, or by three citizens to be summoned and sworn by a Justice of the Peace, and when the damages are so ascertained, the owner or occupent of such shore may have the seine, boat and articles so distrained, appraised, and sold to pay such damages.

Owner may seize seine.

Sec. 27. All fines and penalties imposed by the preceding sections of this Article, if they do not exceed one hundred dollars, may be recovered by action of debt in the name of the State before a Justice of the Peace, and if over one hundred dollars, by indictment in the Circuit Court for the county where the offence is committed.

Mode of recovering fine.

Sec. 28. If the name of the offender be unknown, he may be arrested on a warrant describing him as the person committing the offence, without stating his name in the warrant.

Warrant where offender is unknown.

Sec. 29. All forfeitures of property incurred under this Article may be enforced in this way; the Sheriff or Constable shall, on complaint made to him, seize the property alleged to be so forfeited, and give notice to the owner thereof, if the

Seizure.

owner can be found, to appear before a Justice of the Peace of the county where the seizure is made, on a certain day within five days from time of seizure to show cause why the property so seized should not be condemned; and if the owner of the property so seized evades the service of said notice, then the Sheriff or Constable may set up notices at three of the most public places in the neighborhood of the seizure, warning the owner of such property to appear before a Justice of the Peace to be therein named, on a certain day, not less than ten days from the time of seizure, to show cause why the said property could not be condemned.

Condemnation

Sec. 30. If upon the hearing in any case of seizure as aforesaid the Justice is satisfied that the owner or person having charge of the property so seized is guilty of violating any of the provisions of this Article which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, (or if he be dead or removed away, by some other officer,) on ten days' public notice; and the Justice may proceed ex parte to hear and determine any question of forfeiture, if the owner fails to appear after the notice herein required to be given.

Condemnation where offender is unknown.

Sec. 31. If the Sheriff or Constable making a seizure of property under this Ariticle does not know the name of the owner or person having charge thereof, he may describe him in the notice he is required to give as the owner of the property, without naming him, and the Justice, if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Proceeds of sale, how divided.

Sec. 32. The proceeds of the sale of any property forfeited as aforesaid shall, after paying the expenses of the seizure, condemnation and sale, be divided, one-half to the Sheriff or Constable making the seizure, and the other half to the informer.

Fines how appropriated.

Sec. 33. All fines imposed under this Article shall go, one-half to the informer and the other half to the county where the fine is imposed.

Sec. 34. If any offence under this Article is committed in a river dividing two counties, then the Justice or Court of either county shall have jurisdiction, or if it is committed in the waters of the Chesapeake Bay, then the Justices or Courts of any counties bordering on that part of the Bay shall have jurisdiction.

Jurisdiction.

Sec. 35. If any person is arrested for any offence under this Article, and the fine is more than one hundred dollars, then the Justice before whom such person is brought shall commit such person, unless he gives adequate bail to appear and answer such offence, at the next Circuit Court for the county.

Commitment where a fine is over $100.

Laws 1864, *Chap.* 71, *add the following sections:*

Sec. 36. It shall not be lawful for any person or persons to whip or beat the water in that part of the Potomac River, lying between the mouth of New Creek and Weaverton dam, with poles, sticks or other things for the purpose of driving the fish into nets seines, fish-baskets or other seines, or to erect any fish-pot, or to fish with any drag-net, fish-basket or other snare, or in any other manner, except with the gig, trot-lines, dip-net or the angling-rod.

Relating to fish.

Sec. 37. Any person or persons offending against the provisions of the last preceding section, shall forfeit and pay for each offence, the sum of thirty dollars, to be recovered in the name of the County Commissioners of the county in which the offence takes place before a Justice of the Peace, one-half to the informer, and the other half to the school fund of the county, and in such action the informer shall be competent witness.

Penalty.

Sec. 38. Every Justice of the Peace shall annually account with the County Commissioners of his county, at the meeting to make the county levy, for all fines received under this Act, under the penalty of fifty dollars for each fine, by him imposed or received.

Justices of the Peace to account.

PATAPSO RIVER.

Laws 1874, *Chapter* 79, *enact the following sections:*

Not lawful.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons to take, capture or destroy fish, by seine or seines, drag-net or drag-nets, set-net or set-nets, dip-net or dip-nets, stir-net or stir-nets, fish-baskets or fish-pots, eel-weirs, brush or fascine-nets, or any means or contrivances whatever of the nature of a seine, which are known to destroy or capture fish, or destroy or capture them by shooting or striking through the ice, or otherwise than by hook and line, commonly known as angling, in the Patapsco River above tide-water.

Fish-ladders.

Sec. 2. *And be it enacted*, That the owner or owners of all dams, erected now or hereafter on said river, shall, and are hereby required to make or cause to be made, and keep in repair, proper fish-ladders, and have them placed on said dam, so as to afford to the fish, in said river, free course up and down said river.

Penalty for failure.

Sec. 3. *And be it enacted*, That if the owner or owners of the aforesaid dams fail to comply with the provisions of the preceding section, within sixty days from the passage and approval of this Act, they, or either of them shall be liable, upon conviction thereof, by summary process before any Justice of the Peace of this State in the county nearest or adjacent to where the dam or dams are situated, to a penalty of not less than fifty nor more than one hundred dollars, five dollars to the informer, and the balance to the Board of County Commissioners of the counties adjacent to said dams or dams for school purposes.

Penalty for violating first section.

Sec. 4. *And be it enacted*, That any person or persons offending against the provisions of the first section thereof, shall be liable, upon conviction thereof by summary process before any Justice of the Peace of this State, in and for the county where the act is committed, to a penalty of not less than ten nor more than thirty dollars, one-third to the informer, one-third to the Constable making the arrest, and the balance to the Treasurer of the Board of County School Commissioners, for school purposes, provided that any person or persons so offending, on conviction thereof as aforesaid, who shall refuse or fail to pay said fine imposed, and the cost thereon, such person or persons shall be imprisoned in the County Jail, where the act shall be committed, for not less than ten, nor more than twenty days.

Appeal.

Sec. 5. *And be it enacted*, That any person or persons who may feel himself or themselves aggrieved by any judgment, rendered by a Justice of the Peace, under the provisions of this Act, shall have the right to appeal to the Circuit Court of the county where the act was committed, upon the conditions and subject to the regulations now provided by the general law regulating appeals from Justices of the Peace, but execution of the judgment of the Justice of the Peace shall not be stayed, unless the party appealing shall give bond to the State for double the amount of fine imposed, with security approved by the Justice rendering the judgment, with condition to prosecute his appeal with effect, or to pay the fine imposed with all costs.

Expires April, 1876.

Sec. 6. *And be it enacted*, That this Act shall take effect from the date of its passage and continue in force until the first day of April, eighteen hundred and seventy-six.

POCOMOKE.

Laws 1862, *Chapter* 171, *enact the following sections:*

Fish in Pocomoke River, provision for their protection.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person to throw or place in the waters of the Pocomoke River, for the purpose of taking or destroying fish therein, any lime, coculus indicus, otherwise called Indian or Indian coculus, or any other poisonous weed or substance, whether the same is mixed with any other substance or not; every person so offending, shall be deemed guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace in the name of the State, such person shall be punished by fine in the discretion of the Justice, of not less than five, nor more than

Proviso.

twenty-five dollars, to be collected by any Constable in the district where such offence may have been committed, in the same manner of other small debts; one-half of said fine shall be paid to the informer, and the other half into the Public School Fund of Worcester county; *provided*, that nothing herein contained shall be intended to apply to any of the waters of said river, below a point called and known by the name of Porter's Bridge.

Appeal.

Sec. 2. *Be it enacted*, That any person deeming himself or herself aggrieved by any judgment of the Justice of the Peace under this Act, shall be entitled to an appeal to the Circuit Court of the county, as in other cases of appeal from judgments of Justices of the Peace.

Laws 1874, *Chap.* 253, *enact the following sections:*

Trout only to be taken with hook and line.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person to take, catch or kill any speckled brook trout, or any speckled river trout, save only with a hook and line, or to have any such trout in his or her possession, except during the months of April, May, June, July and the first fifteen days in the month of August, under a penalty of five dollars for each trout so caught or had in his or her possession; but this section shall not prevent any person or corporation from catching trout in any manner or at any time, in waters owned by them, or upon their premises to stock other waters.

Penalty.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person within the State of Maryland to take or catch any brook trout at any time, in any of the waters of the State, by means of any fish-basket, seine or seines, net or nets, trap or traps, under a penalty of five dollars for each and every fish so taken.

Shall not place lime, &c., in any stream.

Penalty.

Sec. 3. *And be it enacted*, That no person shall place in any fresh-water stream, lake or pond, without the consent of the owner, or in the waters and estuaries with the rivers debouching into them, any lime or other deleterious substance, with the intent thereby to poison or catch fish, under a penalty of one hundred dollars.

Sec. 4. *And be it enacted*, That whenever any person who owns, controls or erects an artificial pond upon his own land, or land of which he is in legal possession, and shall put therein any fish or the eggs or spawn of fish, for the purpose of breeding and cultivating fish, and shall give notice thereof, either in one or more newspapers of the county, or by written or printed handbills put up in public places near said pond, any person who shall thereafter enter upon such premises for the purpose of fishing, or shall catch in said pond or ponds, and take therefrom any fish, shall be guilty of a trespass, and in addition thereto, shall be liable to a penalty of five dollars for the first fish, ten dollars for the second, and twenty dollars for the third and each subsequent offence; *provided*, that this Act shall not prevent the owner of such pond or ponds, or any one by his authority, from catching or taking fish therefrom.

Breeding fish.

Penalty for taking.

Sec. 5. *And be it enacted*, That any person or company engaged in the increase of brook trout by artificial process, (known as fish culture,) may take from his or their pond or ponds in any way, and cause to be transported, and may sell any brook trout, and the spawn of brook trout at any time, and common carriers may transport them, and dealers may sell them, on the condition, that the packages thereof so transported, are accompanied by a certificate from a Justice of the Peace, certifying that such trout are sent by the owner or owners, or agents of parties so engaged in fish culture; and such person or company may take in any way, and at any time, upon the premises of any person, under permission of the owners thereof, brook trout to be kept and used for artificial propagation only, and for no other purpose.

Persons engaged in fish culture may sell.

Sec. 6. *And be it enacted*, That violation of any of the provisions of this Act contained, may be prosecuted by any citizen of the county in which said violation shall take place, before any Justice of the Peace or Circuit Court for said county, the informer to be a competent witness; funds paid as penalties shall be equally divided between the informer and the Public School Commissioners of the county, for the benefit of the Public Schools in the district where the offence is committed.

Any citizen may prosecute

Laws 1874, *Chapter* 150, *enact the following section:*

Appointment of Commissioners of Fisheries.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That the Governor, by and with the advice and consent of the Senate, is hereby authorized to appoint two competent persons, who shall continue in office for two years from the time of their appointment, and until their successors are appointed, who shall be known as Commissioners of Fisheries of Maryland, and that one of the Commissioners shall come from the Eastern, and one from the Western Shore of the State.

Duties of.

Report.

Sec. 2. *Be it enacted*, That it shall be the duty of said Commissioners to immediately proceed to inspect all the waters of this State, with a view of stocking the same with such food fishes as in their judgment shall be most advantageous, and with such object shall communicate with the Commissioner General of Fisheries of the United States, and with the Commissioners of Fisheries appointed by the different States, and report the result of their inspection to the Governor of this State, as soon as practicable, and that they examine into the feasibility of cutting a channel around the Great Falls of the Potomac, to admit the passage of fish from tide-water into Upper Potomac, and that they also inquire into the expediency of constructing fish-ways or fish-ladders to admit the passage of fish over dams or other obstructions in the Upper Potomac, or elsewhere in the State, and that an estimate of cost be made, and a report thereof be made to the next General Assembly of Maryland.

The appointment of two Commissioners had been previously authorized, Chapter 297, *Laws* 1870, *but the Act had expired by its own limitation.*

Duty of Commissioners.

To obtain ova and construct houses for hatching, &c.

Sec. 3. *Be it enacted*, That it shall be the duty of the said Commissioners of Fisheries, after making the inspection and obtaining the information required in the preceding section, to proceed to the selection of proper locations for the propagation and culture of such food fishes as it shall be deemed desirable to introduce into the waters of this State, and obtain the necessary ova, and construct and erect suitable houses and devices for hatching the same, and protectiong the small fish, until fit to be distributed, and then to distribute the same among such waters of this State as shall be deemed proper.

To make annual report.

Proviso.

Sec. 4. *Be it enacted*, That it shall be the duty of the said Commissioners to make an annual report to the Governor, for transmission to the General Assembly of the State, of the work accomplished by the Commission, and also embracing such suggestions of food fishes in the waters of this State, as may be the result of their observation and experience; *provided*, that nothing in this Act shall interfere with any existing rights of catching fish in the waters of this State.

Salaries of

Sec. 5. *Be it enacted*, That the salaries of said Commissioners, shall be fifteen hundred dollars per annum each, and that the sum of three thousand dollars per annum, be and the same is hereby appropriated to pay the said salaries.

Appropriation

Sec. 6. *Be it enacted*, That the further sum of thirty-five hundred dollars per annum, or so much thereof as may in the opinion of the Governor, be necessary, be and the same is hereby appropriated for the purpose of carrying out the provisions of this Act, and the Comptroller shall issue his warrant on the Treasurer for the payment of the said sum, on presentation of the accounts of the said Commissioners, approved by the Governor, out of any monies in the Treasury, not otherwise appropriated.

Public Local Laws

ON

FISH AND FISHERIES.

FISH AND FISHERIES.

Public Local Laws.

ANNE ARUNDEL COUNTY.

Code Public Local Laws, Art. 2.

Sec. 98. It shall not be lawful for any person to use in the rivers or waters of Anne Arundel county, any seines or nets, the meshes of which shall be less than one inch and a quarter square, except such seines or nets, as do not exceed ten fathoms in length. Size of lawful Seine.

Sec. 99. If any person shall use or haul in the rivers or waters of said county, any seine or net exceeding ten fathoms in length, the meshes of which shall be less than one inch and a quarter square, he shall forfeit and pay for each offence, the sum of twenty dollars, to be recovered in the name of the State, before any Justice of the Peace, as other small debts; one-half to the use of the informer, and the other half to the use of the State. Penalty.

Laws 1870, *Chapter* 408, *enact*—

Sec. 4. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons, except *bona fide* residents of the State of Maryland, to set nets or haul seines in any of the rivers, creeks or coves lying in Anne Arundel county. Must be residents.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons except *bona fide* residents of the State of Maryland, to take or catch terrapins or crabs in any of the rivers, creeks or coves lying in said county.

Sec. 3. *And be it enacted*, That any person violating the provisions of either of the preceding

Penalty.

sections of this Act, shall pay a fine of not less than five, nor more than fifty dollars, and forfeit the boat or boats and vessels in his possession, together with the seine or seines, tackle and all things on board at the time the offence may have been committed.

Sheriff to arrest.

Condemned.

Publish notice.

Sec. 4. *And be it enacted*, That it shall be the duty of the Sheriff, or any Constable, on complaint made to him to arrest any person or persons, so violating the foregoing sections of this Act, and to seize the boat or boats and vessels, together with the seine, tackle and all things on board, alleged to be forfeited, and give notice to the owner or owners thereof, if the same can be found, to appear before a Justice of the Peace of Anne Arundel county on a certain day, within five days from the time of seizure, to show cause why the property so seized should not be condemned, and if the owner or owners of the property so seized evade the service of the notice, or cannot be found, then the Sheriff or Constable may give notice by publication in some newspaper published in Anne Arundel county, or may set up notices at three of the most public places in the neighborhood of the seizure, warning the owner or owners of such property to appear before a Justice of the Peace of said county to be therein named, on a certain day, not less than ten days from the time of the seizure, to show cause why the said property shall not be condemned.

Judgment of Justice.

Failing to appear.

Sec. 5. *And be it enacted*, That if, upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner, or person or persons having charge of the property so seized, is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, after ten days public notice, and the Justice may proceed *ex parte* to hear and determine any question of forfeiture; if the owner or owners fail to appear after the notice herein required to be given, and in all cases arising under this Act, an appeal may be had to the Circuit Court for Anne Arundel county, subject to the same laws and rules that govern in other cases of appeal from the decision of Justices of the Peace.

Describe if not known.

Sec. 6. *And be it enacted*, That if the Sheriff or Constable making the seizure of property under this Act, does not know the name of the owner or person having charge thereof, he may describe him in the notice he is required to give, as the owner of the property without naming him, and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Appropriation of fines.

Sec. 7. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid with all fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided, one-fourth to the Sheriff or Constable making the seizure, one-fourth to those aiding in making the arrest and seizure, and the remaining one-half to the Board of School Commissioners for Anne Arundel county, for the use of the primary schools of said county.

BALTIMORE COUNTY.

Code of Public Local Laws, Art. 3.

Quick lime.

Sec. 109. No person shall destroy the fish in any branch or creek in Baltimore county, by putting quick lime therein, under the penalty of twenty dollars for each offence, to be recovered before a Justice of the Peace of said county, one-half to the informer, and the other half to the use of the county.

Penalty.

Forfeiture.

Sec. 110. Any master or overseer, wilfully suffering any servant or slave under his management, to put quick lime in any stream of water in said county, shall forfeit the sum of twenty dollars, to be recovered and applied as directed in the preceding section.

Sec. 111 *seems to be repealed by Art.* 26, *Declaration of Rights, Const. Md., p.* 18.

Laws 1874, *Chapter* 348, *enact*—

Not be lawful.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons to take, capture, or destroy fish by seine, drag-net, set-net, stir-net, fish-baskets or fish-pots, weirs or other means or contrivances whatever of the nature of a seine, which are known to destroy or capture fish, or to destroy or capture them by shooting or striking them on the ice, one mile above tide-water within the limits of Baltimore county, in this State; *Provided*, that it may be lawful to fish in anyway in any of the said tributaries one mile above the mouth of said tributaries.

Offending.

Sec. 2. *And be it enacted*, That any person or persons so offending against the provisions of the preceding section, shall be liable upon conviction thereof, by summary process, before any Justice of the Peace of this State, in and for Baltimore county, to a penalty of not less than ten nor more than thirty dollars; one-third to the informer, one-third to the Constable who may make the arrest, and the balance to the Treasurer of Baltimore county, to be applied to road and bridge purposes; *Provided*, that any person or persons so offending, on conviction thereof, as aforesaid, who shall refuse or fail to pay said fine imposed, and the cost thereon, such person or persons shall be imprisoned in the county jail of the county aforesaid for not less than ten nor more than twenty days.

Duty of Sheriff.

Sec. 3. *And be it enacted*, That it shall be the duty of the Sheriff, Deputy-Sheriff or constable to whose attention a violation of the provisions of this Act is called, at once to report the same to a Justice of the Peace, and upon warrant being issued, to arrest the offender or offenders, and bring him or them before said Justice for trial; any Constable who fails so to report a case of offence, with the name of the informer, under this Act, when notified as aforesaid, shall himself be liable to a penalty of ten dollars, to be recoverable as like penalties are now recoverable.

Appeal.

Sec. 4. *And be it enacted*, That any person or persons who may feel himself or themselves aggrieved by any judgment rendered by a Justice of the Peace, under the provisions of this Act, shall have the right to appeal to the Circuit Court for Baltimore county, upon the conditions and subject to the regulations now provided by the general law regulating the appeals from Justices of the Peace; but the execution of the judgment of the Justice of the Peace shall not be stayed, unless the party appealing shall give bond to the State for double the amount of the fine imposed, with security approved by the Justice rendering the judgment with condition to prosecute his appeal with effect, or to pay the fine imposed with all costs.

CAROLINE COUNTY.

Laws 1874, *Chapter* 466, *Sects.* 2 *and* 3, *of this Act, repeal Sections* 90 *and* 91, *of the Code of Public Local Laws, and re-enact the same as given in the text.*

Sec. 2. *And be it enacted*, That it shall not be lawful for any person with the exception of *bona fide* resident voters of Dorchester, Talbot and Caroline counties, and they shall first obtain permission of the occupants or owners of lands bordering on said waters, of said counties heretofore named, to take or catch fish in the waters of said counties, with seines, with meshes of less size than five inches square. Not be lawful.

Sec. 3. *And be it enacted*, That it shall not be lawful for any person to empty their seines in water less than twelve inches deep; and all persons violating the two preceding sections of this Act, in either of the aforesaid counties, shall upon conviction thereof before a Justice of the Peace, in the county where the offence shall be committed, be fined not less than five, nor more than fifty dollars, or shall be subject to a forfeiture of the same the boat and appurtenances thereunto belonging, in the discretion of the said Justice; *provided*, that an appeal to the Circuit Court may be taken at any time within ten days from the rendering of such judgment under bond and approved security. Not be lawful. Penalty.

Sec. 92. Any Justice of the Peace of the said county, may issue his warrant, directed to the Sheriff or any Constable of the county, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt shall fine him not less than five nor more than fifty dollars, and shal also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used in violation of said sections, and all the furniture, tackle and apparel, and all things on Penalty.

board at the time of the seizure, and shall direct the Sheriff or Constable to sell the same to the highest bidder after ten days notice at two of the most public places in the neighborhood.

Appropriation of fines.

Sec. 93. After the payment of the costs of prosecuting the offending party, the proceeds of the fine and sale of the boat and other articles condemned shall be apportioned in the following manner: one fourth to the Sheriff or Constable making the arrest and seizure, and the residue amongst those whom he may have summoned, and who have aided in the same, to be determined and awarded by the Justice of the Peace.

Appeal.

Sec. 94. Any person aggrieved by any judgment rendered against him by any Justice under this law, may appeal therefrom to the Circuit Court of Caroline county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases.

Penalty.

Sec. 95. If any free person shall whip or beat the water in Great Choptank River, with poles or sticks or other things for the purpose of driving the fish in that part of the river between the Stock Landing and Blade's Overgrowing, during the months of March, April and May, in any year, he shall forfeit and pay for each offence the sum of sixty dollars, to be recovered by action of debt, or bill of indictment, either in the county where the offence was committed or where the person offending shall reside, one half to the informer or person suing for the same, the other half to the use of the county in which he shall be convicted.

Section 96, *is repealed by Article* 24, *Declaration of Rights, Const Md., Page* 18.

Justice must account.

Sec. 97. Every Justice of the Peace shall annually account to the County Commissioners of said county, for all sums of money received by virtue of this law, under the penalty of twenty dollars.

CECIL COUNTY.

Public Local Laws, Article 8.

Duty of Constable.

Sec. 98. The County Commissioners of Cecil county shall appoint annually a Constable in the district adjoining the Bald Friar Ferry, on the Susquehanna River, whose duty it shall be to examine every fish-pot erected in the river at least once a week in the season the young shad usually descend the river, and if he find any fish-pot or net erected in the river within the limits of Cecil county, wherein the bottom slats shall be more than one and a half inches wide, or placed together closer than three quarters of an inch, or not rounded on the top part, or with the bottom thereof covered with a basket, or any other device so as to close the opening therein, whereby the young shad may be destroyed, he shall give notice thereof to any Justice of the Peace of the county, who shall upon such information of said Constable, or of any other person on oath, issue his warrant to apprehend such owner, and take him before some Justice of the Peace of the county, and he shall, by the Justice before whom he may be taken, be compelled to enter into recognizance for his appearance at the next term of the Circuit Court for Cecil county.

Fine.

Sec. 99. The person so arrested shall be proceeded against by indictment in the Circuit Court aforesaid, and upon conviction or confession of the offence charged, shall be fined by the Court not exceeding sixty dollars for any such offence, one-half to the Constable aforesaid, or such other person as shall prosecute for the same, the other half to the use of the county.

Pay of Constable.

Sec. 100. The said Constable, for the discharge of the duties aforesaid, and upon his making oath thereto, shall be allowed by the County Commissioners the sum of sixteen dollars per annum.

Laws 1870, *Chap.* 165, *enact*—

Not to catch fish.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons to whip or beat the waters of Mill Creek, or the waters of Principio Creek, in Cecil county, with poles, sticks or any other thing, for the purpose of driving fish into seines, nets, fish-baskets, or any other contrivance for catching fish.

Penalty.

Sec. 2. *And be it enacted*, That any person or persons violating the provisions of the preceding section of this Act, and who shall be convicted before a Justice of the Peace of Cecil county, for the same, shall forfeit the boats, nets, seines and other fixtures used by such offender or offenders at the time of so violating the same; and the proceeds of the sale of such forfeited property or fixtures, after deducting the costs of prosecution, shall be paid, one-half to the informer and the other half to the School Commissioners of Cecil county, for the benefit of the Public Schools of said county.

Laws 1874, *Chapter* 388, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That no person or persons shall fish at any time in the waters of the Elk River and North East River and their tributaries, lying and being within the limits of Cecil county, with any hauling seine of any description, the meshes of which are of less measure than what is generally known as "inch and a quarter mesh."

Prohibited.

Violating.

Sec. 2. *And be it enacted*, That any person or persons violating the provisions of this Act, upon conviction thereof before any Justice of the Peace in Cecil county, shall pay a fine of twenty dollars, and forfeit such seine, and the boats and materials used in fishing the same, which shall be sold at public auction for cash, one-half of said fine and the proceeds of said sale shall go to the officer making the arrest, and the other half to the Public School fund of said county.

CHARLES COUNTY.

Laws 1872, *Chapter* 198, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons, except *bona fide* residents of Charles county, to take or catch terrapins, or to haul a seine in any of the inlets or tributaries of the Potomac River, lying in Charles county, nor within five hundred yards of the beach on the Potomac

Proviso.

Non-residents not to take or catch terrapins.

Further proviso.

River, between Maryland Point in Charles county and Chiseldine's Island in St. Mary's county, nor in the Wicomico river; *provided*, that persons owning or occupying lands on the Wicomico River or on the Potomac River, or any tributaries thereof in Charles county, shall have the right to rent or otherwise grant to non-residents of the county the privilege of fishing on their shores, or within the prohibited line on their water-front; *provided further*, that any land owner desiring or intending to rent or grant the privilege to fish on his water-front, shall ascertain and distinctly mark the line dividing his land and water-front, from that of the adjoining land owner; and the manner of making said dividing line, shall be by fixing a substantial stake or buoy, immediately on his dividing line, five hundred yards from the beach, and another in the same line, half way between the beach and the outer stake or buoy; and where the water-front is on a creek, the centre of the creek shall be marked in a similar manner, to prevent an infringement on the rights of persons owning the opposite shore.

Time in which persons may haul seine.

Sec. 2. *And be it enacted*, That no person or persons shall haul a seine more than eighty fathoms in length in that portion of the Potomac River, between Maryland Point, in Charles county, and Chiseldine's Island, in St. Mary's county, except from the fifteenth day of March to the first day of June, inclusive.

Persons violating this Act to pay fine, &c.

Sec. 3. *And be it enacted*, That any person or persons violating the provisions of either of the preceding sections of this Act, shall pay a fine of not less than five, nor more than fifty dollars, and forfeit the boat or boats, and vessel in his or their possession, together with the seine or seines, nets, tackle and all things on board, or in anywise pertaining thereto, at the time the offence may have been committed, and in case any person or persons are charged with the violation of any of the provisions of this Act, the burden of proof of evidence shall be upon the person or persons so charged.

Justice of the Peace to issue warrant for the arrest of

Sec. 4. *And be it enacted*, That upon information given upon oath to any Justice of the Peace of the county of Charles, of any violation of any of the provisions of this Article, he shall issue his warrant for the arrest of the offender or offenders, which shall be directed to the Sheriff or any Constable of the county, to be dealt with according to law, and in such warrant it shall not be necessary to name any such offender or offenders, or the owner of any such property, but it shall be sufficient to describe them or him as persons, or a person guilty of violating the law without naming such person or persons.

Arrest without warrant.

Sec. 5. *And be it enacted,* That it shall be lawful for any citizen or citizens, and it shall be the duty of the Sheriff or any Constable of the said county of Charles to arrest with or without warrant, any person or persons violating the foregoing sections of this Act, and to take them before some Justice of the Peace of the county for trial under this Act, and to seize the boat or boats and vessel, together with the seines, nets, tackle and all things on board, or in anywise pertaining thereto, used in such violation as aforesaid, and give notice to the owner or owners thereof, if the same can be found, to appear before a Justice of the Peace of Charles county on a certain day, within five days from the time of seizure, to show why the property so seized should not be condemned, and if the owner or owners of the property so seized, evade the service of said notice or cannot be found, then the Sheriff or Constable, or citizen or citizens making arrest, may give notice by publication in some newspaper published in Charles county, or may set up notice at the most public places in the *neighborhood* of the seizure, warning the owner or owners of such property to appear before a Justice of the Peace of Charles county to be therein named, on a day certain, not less than ten days from the time of seizure, to show cause why the said property should not be condemned.

Satisfied of guilt.

Condemned and sold.

Sec. 6. *And be it enacted,* That if upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner or person or persons having charge of the property so seized is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation then such Justice shall adjudge the same to be condemned and sold by the Sheriff or Constable seizing the same, after ten days public notice, and in case such seizure shall be made by any citizen or citizens other than the Sheriff or a Constable, then the sale of the property so seized shall be sold on ten days' public notice by the Sheriff or any Constable the said Justice may designate, and if the owner or owners fail to appear after the notice herein required to be given, the Justice shall proceed *ex parte* to hear and determine any question of forfeiture, and in all cases arising under this Act there shall be an appeal to the Circuit Court for Charles county, subject to the same law and rules that govern in other cases of appeal from the decisions of Justices of the Peace.

Proceed *ex parte.*

Sec. 7. *And be it enacted*, That if the Sheriff or Constable, or any citizen or citizens, as prescribed in the first section, making seizure of property under this Act, does not know the name of the owner or person having charge thereof, he or they may describe him in the notice required to be given as the owner of the property without naming him and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law without naming such person.

Name no known.

Sec. 8. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid, with all costs of prosecution and fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided one-fourth to the Sheriff or Constable making the seizure, *one-fourth* to those aiding in making the arrest and seizure, and in case the arrest and seizure is made without the aid of an officer, then one-half to those making the arrest and seizure, and in all cases, one-half to the County Commissioners of Charles county, to be expended in repairing the public roads of said county, and in default of the payment of such fines and costs of arrest and prosecution, the person or persons convicted of the violation of any of the provisions of this Act, shall be committed to the county jail for thirty days, unless such fine and costs be sooner paid.

Disposition of proceeds of sale.

Sec. 9. *Be it enacted*, That any person who shall attempt to violate any of the provisions of this Act, shall be guilty of a misdemeanor, and on conviction thereof, shall be dealt with and punished as if he had violated said Act; and the finding of any non-resident of the county upon any of the tributaries of the Potomac River,

Conviction of party attempting to violate.

lying wholly, or in part in Charles county, (save as herein excepted,) having in his possession any seine, net, tackle or other contrivance generally used in taking terrapins, or in hauling seines for fish, shall be *prima facie* evidence of such attempt by such person.

Sec. 10. *And be it enacted*, That nothing contained in this Act, or in the [the] Act passed January Session, eighteen hundred and seventy, chapter sixty-one, shall be construed to prohibit the citizens of Charles and St Mary's counties, having a common right to fish in that inlet or tributary of the Potomac River, commonly called Wicomico River, save as may conflict with section one of this Act, where shores are distinctly marked and designated as therein required.

DORCHESTER COUNTY.

Code Public Local Laws, Article 10.

Sections 2 *and* 3, *Chapter* 466, *Laws* 1874, *the provisions of which have been given above under the head of Caroline County, now constitute Sections* 113 *and* 114 *of this Article.*

Penalty.

Sec. 115. Any Justice of the Peace of said county may issue his warrant, directed to the Sheriff or any Constable of the county, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt shall fine him not less than five nor more than fifty dollars; and shall also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used by such person, and all the furniture, tackle and apparel, and all things on board at the time of her seizure; and shall direct the Sheriff or Constable to sell the same to the highest bidder for cash, after ten days notice at two of the most public places in the neighborhood.

Apportionment of fines and forfeitures

Sec. 116. After the payment of the costs of prosecuting the offender, the proceeds of the fine, and the sale of the boat and other articles condemned, shall be apportioned in the following manner:— One-fourth to the Sheriff or Constable making the arrest and seizure, and the residue among those whom he may have summoned, and who may have said in the same to be determined and awarded by the Justice of the Peace.

Sec. 117. Any person aggrieved by any judgment rendered against him by any Justice, under the 115th Section of this Article, may appeal therefrom to the Circuit Court for Dorchester county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases.

Appeal.

Laws 1872, *Chapter* 170, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any non-resident of the State, to take or catch fish in any manner or way, in the waters of the Nanticoke River, without first obtaining from the Clerk of the Circuit Court of either Wicomico or Dorchester counties, a license therefor, which license shall be granted upon paying twenty dollars to said Clerk for the use of the State of Maryland; said license shall be in force for one year from date of granting, and shall be confined to one boat or vessel therein named. Any person not a resident of the State, violating this section, shall, upon conviction before any Justice of the Peace of the State of Maryland, be subject to a fine of not less than fifty or not more than one hundred dollars, and forfeit the boat or vessel, and all nets, seines or tackle so used in taking fish; the proceeds of said fine and forfeited property, after paying officers' fees, to be paid to the Clerk of the Circuit Court of the county where tried, for the use of the State.

Not lawful without License.

Sec. 2. *And be it enacted*, That upon information of any person made to any Justice of the Peace of either of said counties, the said Justice shall issue his warrant to some Constable or Sheriff, for the arrest of said persons violating the preceding section, and have the said person or persons brought before him for trial.

Warrant.

Sec. 3. *And be it enacted*, That any party or parties, against whom any Justice of the Peace may render a judgment under this Act, either to pay a fine or of condemnation of property, may at any time within ten days from the rendition of such judgment, appeal from such judgment to the Circuit Court of said counties respectively; but no execution or sale shall be stayed unless the party

Appeal.

May appeal.

appealing shall give bond, with security, to the State of Maryland, in double the value of property condemned, or of the fine imposed, as the case may be; said security or securities to be resident or residents of the State, and who shall swear or affirm that he or they are worth double the amount of the property condemned, with condition to prosecute such appeal with effect, and to pay the value of the property condemned, and fine imposed, and all costs attending such proceedings in case such judgment shall be confirmed, and in all cases of appeal either party shall be entitled to trial by jury.

To give security.

Laws 1872, *Chap.* 267, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall be unlawful for non-residents of *Dorchester* county, to take, catch, destroy, or dredge for terrapins in the waters of said county; any person or persons violating the provisions of this Act, upon conviction before any Justice of the Peace of said county, shall forfeit and pay the sum of not less than fifty dollars, nor more than one hundred dollars, and stand committed to the jail of said county, until the same shall have been paid; one-half of said fine to go to the informer, the other half to be paid into the treasury of the school fund of said county by the Justice of the Peace before whom the case may have been tried.

None save residents to fish.

FREDERICK COUNTY.

Laws 1862, *Chapter* 241, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That any person or persons, throwing, putting or placing lime, or any other poisonous substances, into any of the creeks, streams of water, or any of their tributaries, in Frederick county, for the purpose of catching, taking, or destroying fish in any of the said creeks, streams of water, and their tributaries in said county, shall for every such offence, upon conviction thereof before a Justice of the Peace of said county, be fined in a sum of not less than twenty nor more than fifty dollars; said fines to be applied to the primary school fund of Frederick county.

Throwing lime or poisonous substance in creeks, &c., forbidden.

Upon failure to pay fine the offender shall be committed to jail.

Sec. 2. *And be it enacted*, That in the event of the failure or refusal of any person so convicted, to pay such fine, the Justice of the Peace imposing said fine shall commit him to the jail of Frederick county, for not less than three nor more than six months.

Laws 1872, *Chapter* 238, *enact*—

Authorized to construct "Fish Ways.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That the County Commissioners of Frederick county be, and they are hereby authorizsd in their discretion, to levy upon the assessable property of said county, a sum of money sufficient to defray the expense of the construction of "Fish Ways," or ladders, to facilitate the passage of fish over the mill dams at *Greenfield* Mills and Buckeystown on the Monocacy River in said county, said ways to be constructed under the discretion of such person or persons as may be designated by said County Commissioners.

Laws 1874, *Chapter* 173.

This Act repeals Section 1 *of Chapter* 320, *Laws* 1872, *and re-enacts the same with amendments.*

Not lawful.

Sec. 1. From and after the passage of this Act, it shall not be lawful for any person or persons to take, capture or destroy fish by seine or seines, drag-net or drag-nets, fish-baskets or fish-pots, eel weirs, brush or fascine nets, or any means or contrivance whatever, of the nature of a seine, which are known to destroy or capture fish, in the Monocacy River, or any of its tributaries within the limits of Frederick county in the State; *provided*, that it may be lawful to (lawful to) take fish in any way in any of the said tributaries, one mile above the mouth of such tributaries.

Laws 1872, *Chapter* 320, *expired by limitation.*

HARFORD COUNTY.

Code Public Local Laws, Art. 12.

Duty of Constable.

Sec. 38. The County Commissioners of Harford county, shall appoint annually a Constable in the district adjoining the Bald Friar Ferry, on the Susquehanna River, whose duty it shall be to examine every fish pot erected in the river, at least once a week in the season the young Shad usually descend the river, and if they find any fish nets erected in the river within the limits of Harford county, not constructed so as to admit the free passage of young Shad, or with the bottom thereof covered with a basket or any other device, so as to close the opening therein whereby the young shad may be destroyed, they will give notice thereof to any Justice of the Peace of the county, who shall upon such information of said Constable, or of any other person on oath, issue his warrant to apprehend such owner and take him before some Justice of the Peace of the county, and he shall, by the Justice before whom he may be taken, be compelled to enter into recognizance for his appearance at the next term of the Circuit Court for Harford county.

Indictment.

Sec. 39. The person so arrested shall be proceeded against by indictment in the Circuit Court aforesaid, and upon conviction or confession of the offence charged, shall be fined by the Court not exceeding sixty dollars for any such offence, one-half to the Constable aforesaid, or such other person as shall prosecute the same, the other half to the use of the county.

Fine.

Pay of Constable.

Sec. 40. The said Constable, for the discharge of the duties aforesaid, and upon his making the oath thereto, shall be allowed by the County Commissioners, the sum of sixteen dollars per annum.

Penalty.

Sec. 41. If any person using a fishery on the west side of the Susquehanna River, shall, for the space of ten days after the expiration of the fishing season, neglect to remove any putrifying pickle from the fishing shore, and cleanse the vessels used in curing fish, or suffer quantities of fish to remain and putrefy on the fishing shore he shall forfeit the sum of five dollars and immediately remove such putrid fish and pickle, and cleanse the vessel used in curing fish, and on refusal, or neglect so to do, for the space of five days thereafter, shall forfeit the sum of twenty dollars; the said penalties to be recovered before a Justice of the Peace for Harford county as small debts, the one-half to the informer and the other half to the county.

Laws 1867, *Chapter* 47, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That the fishing season in the waters of Romney Creek, in Harford county, shall begin on the fifteenth day of March, and end on the first day of October succeeding in each and every year, and fishing in every mode and manner is hereby prohibited in said creek, for the time intervening between the first day of October and the fifteenth day of March succeeding in each and every year.

Fishing limited.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons to whip or beat the waters of Romney Creek, in Harford county, with poles, sticks or any other thing for the purpose of driving fish into seines, fish-baskets or any other contrivances for catching fish, nor for the purpose, or which will have the effect of driving or frightening wild ducks or water fowl of any description from their breeding or roosting grounds in said creek, or to erect any fish-pot, or to fish with any drag-net, fish-basket, or any other snare during the time intervening between the first day of October and the fifteenth day of March succeeding, in each and every year.

Certain practices declared unlawful.

Sec. 3. *And be it enacted*, That if any person shall violate any of the provisions of this Act, he shall, for every such offence, upon conviction before any Justice of the Peace of Harford county, be fined a sum not less than ten dollars nor more than thirty dollars, one-half of said amount to be given to the informer, and the other half to be paid over to the School Commissioners of said county for school purposes.

Penalty for non compliance.

Sec. 4. *And be it enacted*, That in the event of the failure or refusal of any person so convicted to pay such fine, the Justice of the Peace imposing the fine, shall commit him to the Jail of Harford county, for not less than thirty, nor more than sixty days.

To be imprisoned.

Laws 1870, *Chapter* 231.

This Act originally embraced Caroline and Kent counties, but by Chapter 31, *Laws* 1872, *they were exempted from its provisions.*

Not to beat or lash the water.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons, to lash or beat the waters within the limits of Queen Anne and Harford counties, or which wash the shores of all or any two, or either of these counties, with rods, poles, sticks or anything else, or make noises on the deck of any boat or on part of any boat by the use of clogs or wooded shoes, or by any other instrument or means or in any other manner for the purpose of driving fish into any seine, fish basket, or any other contrivance for catching fish, nor for the purpose or which will have the effect of driving or frightening wild ducks or water fowls of any description from their feeding or roosting grounds in the water of said counties.

Fine for violating.

Sec. 2. *And be it enacted*, That any person violating any of the provisions of the preceding section shall pay a fine of not less than ten nor more than one hundred dollars, and forfeit the boat together with her tackle and apparel, and her seine and all other property on board of her at the time of her seizure.

Warrant and seizure.

Sec. 3. *And be it enacted*, That on information given on oath to a Justice of the Peace of that county most adjacent to the waters in which it is claimed a violation of the first section of this Law is being or has been committed, he shall issue his warrant for the arrest of the offender or offenders, and the seizure of the boat together with all her tackle and apparel, and all other property on board, and in their posession, which warrant shall be directed to the Sheriff or some Constable of said county, and the Sheriff or such Constable may summon the *posse comitatus* to aid him in making any arrest and seizure authorized by this Act.

Penalty.

Sec. 4. *And be it enacted*, That upon the arrest of the offenders they shall be taken before a Justice of the Peace, of that one of the aforesaid counties most adjacent to the waters in which the offence has been committed, and tried, and if found guilty, shall pay a fine of not less than ten, nor more than one hundred dollars, to be recovered as other small debts are now recovered, and the said Justice shall condemn all property seized by the officers making the arrest, which shall appear in proof to have been in possession of the parties found guilty, or used by them in violation of the first section of this Act, and adjudge and decree the same to be sold.

Sec. 5. *And be it enacted,* That the property so as aforesaid condemned shall be sold by the officer making the seizure on ten days notice by either written or printed advertisement placed in four public places, and the proceeds of sale after deducting the costs of proceedings, and the expenses of sale shall be divided as follows: one-fourth to the officer making the seizure, and the residue to be divided equally among the persons who aided him in making such seizure. Sale of property.

Sec. 6. *And be it enacted,* That any party who had been adjudged guilty of a violation of the provisions of this Act, and feels himself thereof aggrieved, shall have the right of appeal to the County Circuit Court of the county in which he has had a trial. Appeal.

MONTGOMERY COUNTY.

Laws 1874, *Chapter* 129, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland,* That from and after the passage of this Act, it shall not be lawful for any person or persons, to take, catch or kill any fish in or from the waters of any of the creeks or streams of water in Montgomery county, by any set-nets, dip-nets, or any other device except by hook and line. Not lawful.

Sec. 2. *And be it further enacted,* That any person or persons violating any the provisions of this Act, shall forfeit and pay the sum of five dollars for each and every offence; said sum to be recovered before a Justice of the Peace as debts of like amount are now recoverable in the name of the State, with costs of suit, and to be appropriated to the school fund of said Montgomery county. Penalty.

Sec. 3. *And be it further enacted,* That the County Commissioners of Montgomery county be, and

Levy to pay for the construction of fish ladders.

they are hereby authorized, in their discretion, to levy upon the assessable property of said county, a sum of money sufficient to defray the expense of the construction of fish warps or ladders, to facilitate the passage of fish over any mill-dams, upon any of said creeks or streams of water in said county, said fish warps or ladders to be constructed under the direction of such person or persons as may be designated by said County Commissioners.

QUEEN ANNE'S COUNTY.

Laws 1870, *Chapter* 231.

Provisions same as are given above under the head of Harford county.

ST. MARY'S COUNTY.

Laws 1872, *Chapter* 404.

This Act repeals Chapter 61, *Laws* 1870.

Not lawful for any save residents.

Sec. 2. *And be it enacted*, That it shall not be lawful for any person or persons except *bona fide* citizens of St. Mary's county, to haul a seine in any of the tributaries or waters of the Potomac River, lying and being in St. Mary's county, or to take or catch terrapins in any of the aforementioned tributaries or waters; nor shall it be lawful for any person or persons, except *bona fide* citizens of Charles and St. Mary's counties, to haul a seine or catch or take terrapins in the Wicomico River or its tributaries.

Not lawful to haul seine.

Sec. 3. *And be it enacted*, That it shall not be lawful for any person or persons to haul a seine of more than eighty fathoms in length, withih a mile of the Maryland shore, in that portion of the Potomac River between Cobb's Point, in Charles county, and Point Lookout, in St. Mary's county, except from the fifteenth day of March to the fifteenth day of May, inclusive.

Persons violating.

Sec. 4. *And be it enacted*, That any person or persons violating the provisions of either of the preceding sections of this Act, shall pay a fine of not less than five nor more than fifty dollars, in the discretion of the Justice of the Peace before whom the party or parties may be taken, and forfeit absolutely the boat or boats and vessel in his or their possession, together with the seine or seines, tackle and all things on board the said vessel, boat or boats at the time the offence may have been committed.

Forfeit.

Sec. 5. *And be it enacted*, That upon information given upon oath to any Justice of the Peace, of violation of the provisions of this Act, he shall issue his warrant for the arrest of the offender or offenders, and for the seizure of the vessel, boat or boats, seine and tackle, and all things on board subject to forfeiture, which shall be directed to the Sheriff or any Constable, with or without warrant, to arrest any person or persons violating the provisions of this Act, and to seize any such vessel, boat or boats, or other fishing outfit so found, having been or being used in violating any of the provisions of this Act, and to bring such offender or offenders before a Justice of the Peace most accessible or convenient, to be dealt with as herein provided.

To issue warrant for arrest of.

Duty of officers.

Sec. 6. *And be it enacted*, That it shall and may be lawful for any citizen or citizens having knowledge of the violation of the provisions of this Act, to arrest any person or persons, so as aforesaid violating the provisions of this Act, and to bring such offender or offenders before any Justice of the Peace, to be dealt with according to the provisions of this Act.

Citizens may arrest.

Sec. 7. *And be it enacted*, That if upon the hearing in any case of seizure as aforesaid, the Justice of the Peace is satisfied that the owner, or person or persons having charge of the property so seized, is guilty of violating any of the provisions of this Act, which imposes a forfeiture of such property for such violation, then such Justice shall adjudge the same to be condemned and sold by the Sheriff or any Constable, after ten days public notice, and the Justice may proceed *ex parte* to hear and determine any question of forfeiture, if the owner or owners fail to appear after the notice herein required to be given; and in all cases, arising under this Act, an appeal may be taken to the Circuit Court for St. Mary's county, subject to the same laws and rules that govern in other cases of appeal from the decisions of Justice of the Peace

To be condemned and sold.

May appeal.

Unknown person offending.

Sec. 8. *And be it enacted*, That the Sheriff or Constable, or other party or parties making the seizure of property under this Act, if they do not know the name of the owner, or person having charge thereof, he may describe him in the notice he is required to give as the owner of the property, without naming him; and the Justice if he does not know the name of the owner, may condemn the property as the property of a person guilty of violating the law, without naming such person.

Apportionment of fines and forfeitures

Sec. 9. *And be it enacted*, That the proceeds of the sale of any property forfeited as aforesaid, with all fines imposed and collected under this Act, shall after paying the expenses of the seizure, condemnation and sale, be divided, one-fourth to the Sheriff or any Constable making the seizure, one-fourth to those aiding in making the arrest and seizure, and the remaining one-half to the Board of School Commissioners for St. Mary's county, for the use of the primary schools for said county; and when made by any citizen or citizens, one-half of the net proceeds of sale, after paying the charges as aforesaid, shall be paid over to the captors, to be equally divided between them, and the remaining one-half thereof to be paid to the School Commissioners of said county, for the purposes above-named.

SOMERSET COUNTY.

Code Public Local Laws, Art. 19.

Unlawful to place seine.

Sec. 58. No person shall stake out or fix any seine across the River Wicomico, in Somerset county, or aid or assist therein, by which fish may be obstructed in going up or coming down said river.

Penalty.

Sec. 59. Any person offending against the provisions of the preceding section shall, for every offence, forfeit the sum of twenty dollars, to be recovered by action or indictment in the Circuit Court of the county, where the offender shall be apprehended or resides, one-half to the informer, and the other half to the county.

Sections 60 *and* 61 *are repealed by Art.* 24, *Declaration of Rights, Const. Md.*, *p.* 18.

Sec. 62. Any person may destroy or remove any seine staked or fixed across said river to obstruct the passage of fish, and if he be sued therefor, he may plead the general issue, and give the special matter in evidence.

May lawfully remove seine.

Sec. 63. Every Justice of the Peace who shall receive any money under the provisions of section 61 of this Article, shall, under the penalty of one hundred dollars, account for the same to the County Commissioners of said county.

Justice shall account.

Laws 1874, *Chapter* 383, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That from and after the passage of this Act, it shall not be lawful for any person or persons, except resident citizens of Somerset county to fix, set or stake out any sort of gill-net, either stationary or floating, any device whatsoever, for the catching or taking of herring, shad or other kind of fish in the waters of Monie Bay, Monie Creek, or its tributaries in Somerset county.

None save residents to fish.

Sec. 2. *And be it enacted*, That any person or persons violating the provisions of the preceding section shall be arrested, and the boats seines and materials using in fishing shall be seized; and upon conviction thereof before any Justice of the Peace for Somerset county, shall be fined not less than fifty, nor more than two hundred dollars; one half of said fine to go to the officer making the arrest, and the other half to the school fund of said county.

Penalty.

Sec. 3. *And be it enacted*, That in default of the payment of the fine provided in the second section of this Act, the said boat or boats, seines and materials used in fishing, the same so seized shall be condemned, and sold to pay said fine and costs, after giving ten days' notice thereof by handbills posted near the place of seizure, and if the owner or owners of any property so seized shall be unknown, or shall make his escape, or shall fail to appear within five days after such seizure, the said property shall be condemned and sold as is hereinbefore provided.

Forfeiture.

Laws 1874, *Chapter* 492, *enact*—

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That no person or persons shall take or catch fish with or use or employ in the taking and catching of fish in the waters of the Pocomoke River and Sound, below the village of Shelltown, with any net, seine, pike, fish-trap or any other instrument consisting of meshes smaller than three inches in size.

Size of seine.

Sec. 2. *And be it enacted*, That any person catching or taking fish contrary to the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace of this State, shall be punished by a fine of not less than fifty, nor more than one hundred dollars, one-half thereof shall be paid to the informer, and the other half to the County Commissioners of the county or counties where the offence was committed, for the use of the said county or counties.

Penalty.

TALBOT COUNTY.

Sections 2 *and* 3, *Chapter* 466, *Laws* 1874, *the provisions of which have been given above, under the head of Caroline county, now constitute sections* 86 *and* 87 *of this Art.*

Code Public Local Laws, *Art.* 20.

Sec. 88. Any Justice of the Peace of said county may issue a warrant, directed to the Sheriff or any Constable, against any person offending against any of the provisions of the last two preceding sections, and upon proof of his guilt, shall fine him not less than five, nor more than fifty dollars, and shall also adjudge and condemn as forfeited the boat or vessel in the possession of the offending party, together with the seine used in violation of this law, and all the furniture, tackle and apparel, and all things on board at the time of her seizure; and shall direct the Sheriff or Constable to sell the same to the highest bidder for cash, after ten days' notice, at two of the most public places in the neighborhood.

Fine.

Sec. 89. After the payment of the costs of prosecuting the offending party, the proceeds of the fine and sale of the boat, and other articles condemned, Appropriation of fines.

shall be appropriated in the following manner: one-fourth to the Sheriff or Constable making the arrest and seizure, and the residue amongst those whom he may have summoned, and who may have aided in the same, to be determined and awarded by the Justice of the Peace.

Appeal.

Sec. 90. Any person aggrieved by any judgment rendered against him by a Justice, under the 88th section of this Article, may appeal therefrom to the Circuit Court for Talbot county, within the same time and upon the same terms prescribed for appeals from judgments of Justices of the Peace in other cases.

WASHINGTON COUNTY.

Laws 1874, *Chapter* 334 *This Act repeals the corresponding sections of Art* 21, *Code of Public Local Laws.*

Not lawful.

Sec. 102. It shall not be lawful for any person to whip or beat the water in the Antietam Creek, or its tributary streams, Bear Creek, Long Meadow Branch and Little Antietam, with poles, sticks or other things or the purpose of driving the fish into nets, seines, fish-baskets or other snares, or to erect any fish-pot or to fish with any net, basket, gig, trot-lines, or in any other manner except with the angling-rod and dip-nets.

Forfeiture.

Sec. 103. Any person offending against the provisions of the last preceding section, shall forfeit and pay for each offence, and for every month a fish-pot is suffered to remain, the sum of twenty dollars, to be recovered in the name of the County Commissioners of said county, before a Justice of the Peace, one-half to the informer and the other half to the School Fund of said county.

Section 104, *is repealed by Art.* 26, *Declaration of Rights*, *Con. Md*, *p.* 18.

Justice shall account.

Sec. 105. Every Justice of the Peace shall annually account with the County Commissioners of the county, at their meeting to make the county levy, for all fines received under this law, under the penalty of twenty dollars for each fine by him imposed or received.

Laws 1870, *Chapter* 75, *expired by its own limitation on the* 1st *April*, 1872.

WORCESTER COUNTY.

Laws of 1870, *Chapter* 190. *Section* 2 *of this Act repeals Sec.* 1 *of Chapter* 442, *Laws* 1868, *and re-enacts the same with amendments.*

Length of seine.

Sec. 2. *Be it enacted*, That if any person or persons, shall haul or fish with any seine or seines over one hundred fathoms in length, in Synapuxent Bay or its tributaries, or in any of the bays or their tributaries, on the eastern side of Worcester county, above the line of Virginia, he or they shall be fined in a sum not exceeding one hundred dollars for the first offence and two hundred dollars for every subsequent offence, with all costs accruing in the prosecution of such offender or offenders

Laws 1868, *Chapter* 442, *enact*—

Penalty for fishing.

Sec. 2. *And be it enacted*, That no gill-net, set-seine or other contrivance for catching fish, (otherwise than a hauling seine) in any of the waters aforesaid, shall exceed in length or extent seventy-five fathoms, and any person or persons so offending, shall forfeit and pay one hundred dollars, together with all costs and charges in the prosecution of such offender or offenders

Heard before Justice of the Peace.

Sec. 3. *And be it enacted*, That the offenced named or contemplated by this Act may be hearn by any Justice of the Peace of this State, befors whom the offending party or parties may be brought, or any Justice of the Peace of this State, who, upon information shall issue a warrant for the apprehension of any such offender or offenders; the said Justice upon hearing proof may either discharge the accused, or cause him or them to enter into recognizance, with sureties, in double the amount of the penalty, for any violation of the provisions of this Act, to appear at the then session of the next term of the Circuit Court for Worcester county, to answer for the offence and to satisfy the judgment which may be rendered against him or them therefor, or in default thereofe the said party or parties to be committed to the County Jail until such recognizance be given.

Sec. 4. *And be it enacted*, That all fines or penalties imposed by this Act, shall be divided, one-half to the informer, and the other half to be applied to the improvement of the public roads in said county.

Fines to be divided.

CASES RELATING TO ABOVE SUBJECT MATTER.

As to acquisition of a several right of fishery by prescription.

See Day & Gorsuch *vs.* Day, 4 Md. Rep., 262.

Del. & Md. R. R. Co. *vs.* Stump, 8 G. & J., 479.

The patentee of land covered by navigable water can only claim in subordination to the rights of the public of fishery and navigation.

Hammond's Lessee *vs.* Inloes, 4 Md. Rep., 138.

See, also, Chapman *vs.* Hoskins, 2 Md. Ch. Dec., 485;

And, Patterson, et al., *vs.* Gelston, 23 Md. Rep., 445.

As to fishing on the Potomac with Gill Nets:

The State *vs.* Hoofman, 9 Md. Rep., 28.

Georgetown *vs.* Alex. Car. Co., 12 Pet., 95.

Binney's Case, 2 Bl., 125.

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REPORT

OF A

Commissioner of Fisheries

OF

MARYLAND

JANUARY, 1877.

KING BROTHERS, PRINTERS,
162 West Baltimore Street.

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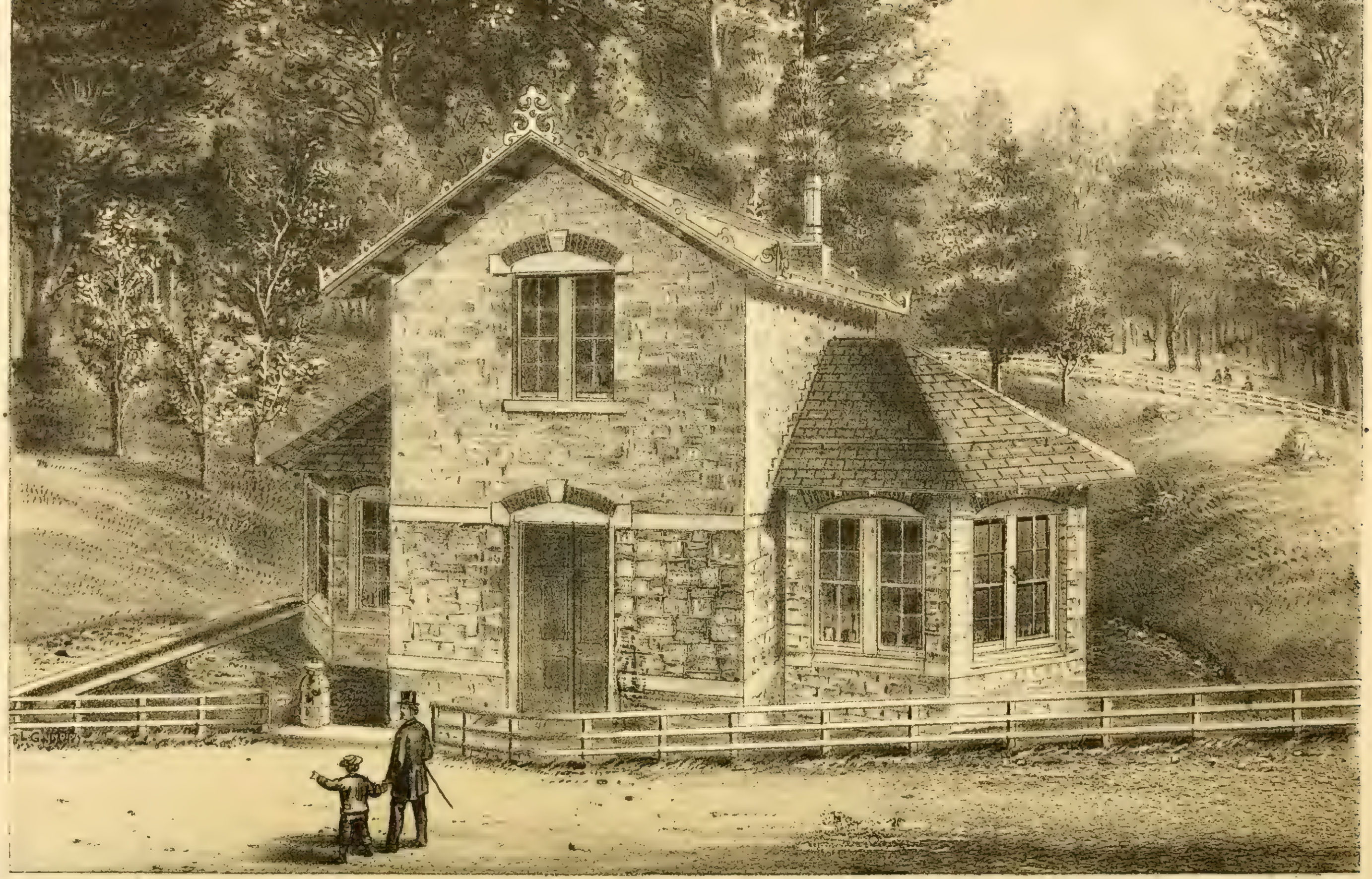

A. HOEN & Cº BALTIMORE.

DRUID HILL HATCHING HOUSE.

REPORT

OF A

COMMISSIONER OF FISHERIES

OF

MARYLAND.

To his Excellency, John Lee Carroll,
Governor of State of Maryland:

Appointed by your Excellency to succeed myself as a Commissioner of Fisheries, I beg leave to make the following report of the work accomplished during the year of 1876:

As much of the efficiency of the Commission is dependent upon the co-operation of the various railroad and steamboat corporations in the State, and as much of the success attained is attributable in a great measure to facilities rendered by them for the quick, and in many instances gratuitous, transportation of young fish from and to various points in the State, we beg leave to return our acknowledgements to the following gentlemen for the aid given us during the year: Vice-Presidents John King and William Keyser, of the Baltimore and Ohio Railroad, and Thomas R. Sharp, master of Transportation on the same road; President J. H. Hood, of the Western Maryland Railroad; President Oden Bowie, of the Baltimore and Potomac; Mr. George C. Wilkins, Superintendent of the Northern Central Railroad, and of the Baltimore and Potomac Railroad; President Isaac Hinckley, of the Philadelphia, Wilmington, and Baltimore Railroad; President Howard B. Ensign, of the Maryland Steamboat Company;

President B. S. Ford, of the Chester River Steamboat Company; and Mr. T. P. Clark, agent of the Eastern Shore Steamboat Company.

We beg leave also to tender our thanks to Mr. Samuel M. Shoemaker, Resident Manager of Adams Express Company, for active co-operation.

We will not, in the present report, simply give a *resume* of the work accomplished during the last year, but will, in some degree, endeavor to foreshadow the work which is proposed in the future. We have deemed it of greater importance, than desultory propagation here and there of even a large number of fish, the establishment of a systematic course of procedure, rather to build up for the future a permanent and efficient organization, than to be dependent on the skilled labor imported from other parts of the country, and on temporary and less efficient structures and apparatus.

If the attempt to introduce the California Salmon into our bay and river is successful, as we have every reason to believe it will be, it will be necessary for some years to come, in order to keep up the supply, and increase their number sufficiently to make them a source of cheap food to the people, to continue this artificial propagation. With this view, instead of renting a place temporarily, and devoting a large proportion of the appropriation to procuring and hatching the eggs of this and the other varieties of the Salmon family, we worked steadily to the erection of a permanent building, in which we and our successors would be able to propagate those varieties, the eggs of which are matured in hatching-houses, and at comparatively small cost.

We now have one of the best hatching establishments in the world, and possibly the most conveniently arranged in this country. The large number of eggs handled by a small force, and the success with which our work has met during the past two seasons, are abundant proofs of the efficiency and capacity of the Druid Hill Hatching House. We have, for the propagation of those varieties of fish which spawn in the Spring, and whose eggs are adhesive, and attach themselves to aquatic vegetation, a series of permanently constructed ponds ; we have also purchased an efficient steamer, of light draught, which will enable us at all times to visit the fisheries of our bay and rivers, and learn more thoroughly the requirements of the service. We can carry on the hatching operations, connected with the increase of those fishes whose eggs will not stand transportation, and must be matured in the rivers where the spawn is taken on a much larger and systematic scale, with much better chances of success than hitherto. We have also constructed several small boats' suitable for gathering the spawn of Shad and Herring, and have each year increased and improved the apparatus used in perfecting the eggs of these fishes.

In entering on the work of propagating Shad, although Shad have been artificially hatched successfully, and on a very large scale, for several years in many of the New England and Middle States, we had a comparatively new field of operation and research. In Maryland we found that the conditions which surround the points, at which eggs could be procured, vastly different from those which surround the points at which Shad spawn could be procured, in telling quantities, in those States which had set us the example, or had taken the lead in the propagation of this valuable fish ; for instance, on the Connecticut river, near South Hadley, the Shad are impeded in their upward migration by this impassable barrier, and congregate in the large pools just below the Falls, where they are taken in considerable quantities by short seines, making a great many hauls between 8 o'clock at night and midnight, the hours in which most ripe fish are taken. The current is somewhat rapid, and the river being narrow, the hatching boxes are well protected from the wind. The eggs, by using the boxes designed by Seth Green, are kept in constant and gentle motion by the current. Similar conditions surround the hatching camp of the New York Commission, on the Hudson River, but our experience on the

Chesapeake Bay and Potomac River, with their widely expanded waters, and the sluggish currents of those locations in which we have to operate, is, that the apparatus used is imperfectly adapted for our requirements. It is hardly possible in the Chesapeake Bay, where the eggs can be procured in sufficient quantities, to get enough current to use the box with an inclined bottom. The motion given to the eggs is rather by the up and down motion of the boxes, as they dance on the swell of the waves, than by the passing current. The inclined bottom of the box, under these circumstances, tends rather to crowd and pack the eggs in the lower edge than give them the required circulating motion, and keep them in suspense.

These, and many other surrounding conditions, have compelled us to modify greatly the apparatus which has been so successful in other waters, and has caused us to devise new systems of operation.

As with the Trout, Salmon and other fish we may have by placing the whole of the means at our disposal in the simple operation of Shad hatching alone, been able during the last season to have turned loose in our waters considerably larger numbers of fish than we succeeded in doing, but we would have been in no better condition to carry on the work in the future, and would not have been able to effect that steady recuperating increase in the yield of our fisheries, which is so important, so necessary, and so entirely possible.

Under the system which we have pursued we are every day becoming better and better able to meet the exigencies of the service, becoming better and better equipped, and we hope during the coming season to be able to carry on this important branch of the service on a larger scale than has ever been attempted in this country.

The State of Maryland is peculiarly fortunate in the possession of a large expanse of water which hitherto has been very productive, but from causes enumerated in our last report, these waters have, year by year, become less and less productive, until, as was the case last season, many of the finest fishing shores in our State will be abandoned as unremunerative.

The restoration of these fisheries, and the reproduction of this large supply of fish food cannot be accomplished without a steady and systematic course of procedure by this department.

During the first two years of our existence we were dependent on the "Board of Oyster Police" for transportation, and received material aid, as it kindly placed the steamer "Leila" at our disposal when her use by us did not interfere with her ordinary survice and duties ; but we found that at the time when we most needed the steamer she was most busily engaged, and that without detriment to the service for which she was intended, we could not rely on her for assistance, nor could we secure her services for a sufficiently long period, to make systematic investigations, or perform our duties continuously. The "Leila" is of such deep draught that we were oftentimes unable to get to those localities where our presence was most needed. It was impossible to procure the services of a suitable steamer by charter as those of light enough draught to navigate in our rivers and estuaries of the bay, are a class of river boats used for passengers and freight, and require a large crew, and involve considerable running expense, greater than the appropriation would warrant for so temporary a benefit. We, therefore, in pursuance of the policy of securing the permanent efficiency of the Commission, purchased the small steamer "Lookout," a vessel in all respects adapted to the performance of the duties which devolve upon us.

By the use of this boat we were able to secure almost all of the eggs that we gathered last season, and despite its being so disastrous a one to the fisheries of the State, we hatched four million six hundred and two thousand Shad.

In future, having the steamer "Lookout," we will be able to move quickly from one fishery to another, gathering the spawn from the ripe fish as the large seines are landed ;

and, by means of an apparatus which we have erected on her decks, transport the eggs from point to point while they are being matured, which will enable us, instead of being dependent upon one fishery, to operate all the fisheries within the space of eight or ten miles. By this means we will be able to procure many times as many eggs as we have hitherto been able to obtain, and hatch many times as many fish.

The apparatus that we refer to consists of a tank with five distributing pipes; which connect with the bottoms of five conical vessels, hung on frames so arranged that the vessels retain their perpendicular, notwithstanding the rocking of the boat; in these tanks the Shad eggs are placed. The reservoir tank is supplied with water from overboard by an independent steam tank-pump, which can be kept constantly going, whether the steamer is in motion or at anchor. The water is passed from the reservoir tank to these hatching vessels, and as it enters at the apex of the cone and runs out at the top, the eggs, being of little specific gravity, are kept in constant motion, and held in suspense by the current of water.

We can keep in this apparatus several hundreds of thousand Shad eggs for a day or two, until we reach the central camp, when they are deposited in the hatching boxes, in which they remain until they are matured.

Our experiments with this apparatus during last season, although then of imperfect construction, demonstrated its value. Although the number of shad hatched last season did not meet our expectations, the experience gained will be of far greater value, and add more to the permanent efficiency of the Commission than even greater success, achieved through methods employed hitherto. We are now able to report that we have the means of carrying on the work in future, in this important branch, on a scale adequate to its importance.

ROCK FISH—(*Roccus lineatus.*)

The Rock Fish or Striped Bass, is very widely distributed on the Atlantic Coast, and enters very largely into the fish food resources of the Sea Coast of the United States, and nowhere are larger specimens found, or is it found in greater perfection than in the waters of the Chesapeake Bay.

Although they are found in abundance on the New England Coast, we understand that the small fish, say of 3 or 4 months growth, have never been taken. This would indicate, that although they roam during the Summer season along the Northern Coast, they spawn farther South.

There can be but little doubt that vast numbers are every year spawned in the Chesapeake Bay, or its tributaries.

The exact character of their spawning beds has never been ascertained, and although in the month of April and early May the female Rock is often taken with roe considerably advanced, yet we have never been able to find the fish sufficiently ripe for the eggs to run, and although we have consulted very many of the oldest and most successful fishermen of our Bay, we never have been able to find one who had taken the Rock with the spawn running from it. This would indicate that their spawning grounds are not adjacent to the ordinary fishing shores, but that when taken in the Shad and Herring seines they are attracted, rather by the abundant food than a desire to reach their spawning grounds.

It shall be our endeavor during the coming season to multiply this most valuable fish.

Last Spring the season was so far advanced when the present appropriation was available, that we were unable to carry out the method suggested in our last report, that was, to collect early in the season a number of adult fish, and keep them in ponds until they were ripe; we would, in this way, be able at least to ascertain with some accuracy the date of their spawning. We imagine, that the imprisonment of the Rock in suitable ponds where they could be kept until ripe, is as practicable as Mr. Atkins has demonstrated the keeping of Salmon to be, from the time they first run in from the Sea, in the Spring, until mature in the Fall.

BLACK BASS—(*Microptorus salmoides.*)

As there has been some opposition to the dissemination of this fish, and their establishment in waters which are productive of Shad and Herring, we have not deemed it advisable during the past year to introduce them, to any large extent, in waters of the State in which they are not now found, or into which they have not previously been introduced. Only a few were procured this year, and those given to private ponds. We have yielded to the wishes of some of those who are largely interested in Shad and Herring fisheries, although we are not satisfied that the introduction of the Black Bass and their protection is a bad policy.

On the upper Potomac they have been a very valuable acquisition, and have been the source of a large supply of cheap food to the inhabitants on its borders, and the fine fishing in that stream has attracted anglers from all parts of the country to enjoy the Bass fishing, nowhere to be excelled.

Since 1854, when about 100 of these fish were placed in the river and canal, near Cumberland, they have increased very rapidly, and now the Potomac is perhaps the best Black Bass river in the country. Our reports, however, record a steady decrease of Bass in the upper portion of the river, and a corresponding increase lower down. The decrease in the upper portions of the river has been accounted for as concomitant to the decrease of the herbivorous fishes, such as Chubs, Minnows and Suckers. These have, it is true, disappeared to a great extent under the fierce depredations on their ranks by the Bass. It has been maintained that the Bass, finding a scarcity of food, have turned upon their own number, and this has caused a decrease in the Bass corresponding to that which has been observed among the Cyprynidæ.

Although our information from, and observations on the river have verified the fact as to the diminution in the upper waters, and an increase about and below the Great Falls, we are, however, not prepared to accept the generally accredited theory which accounts for the decrease on the supposition that they are driven to feed on each other by the exhaustion of their food supply. Although we do not deny that the Bass will devour the young of its species, as will the Trout and other fishes—even the Gold fish, when driven to do so by a want of food—we are inclined to believe that the conditions existing on the Potomac are attributable to other causes. First, and the most potent of these is, the existence of the impassable barriers to the upward ascent of the fishes which are at all migratory in their habits, the six or seven dams thrown across the river to back up the water, in order to supply the Chesapeake and Ohio Canal, and the impassable "Great Falls," situated about fourteen miles from Washington.

On the approach of cold weather in the Fall, the fish naturally work down stream, seeking the deep holes in which to pass their Winter months of semi-hybernation. Many of them, natives of the upper levels, passing over the canal dams and the Falls in their downward migration, on the approach of Spring are prevented from again reaching the localities left on the approach of cold weather. They spawn, and their young are raised in the lower levels. In this way they have gradually worked down the river, the decrease in the upper waters being followed by a consequent increase in the lower levels.

This interruption, to which we have referred, has no doubt been the most potent instrument in the unequal distribution of the fish in the river.

Another cause to which the decrease even on the same levels should be attributed, is the existence in large numbers of "fish-traps" or "fish-weirs."

The Potomac river, from Piedmont to the Great Falls, though there exists between these points no insurmountable natural obstruction to the upward flight of vigorous fish, is, nevertheless, a rapid flowing river, with alternate deep holes and shoal places.

These regions of shoal water, with their frequent ripples and small falls, are the favorite haunts of the Black Bass during the summer months. On the approach of cold weather there is a general exodus from the shoal water to the deep holes of not only the Bass but of the various other varieties of fish that are found in the river. The inhabitants on the river, taking advantage of this habit, this downward migration, have constructed dams from either shore, converging down stream to a point where there is a somewhat deeper channel.

At this point, the apex, is constructed a wooden framework of timber, a pen into which the fish fall; the slats of this trap which are inclined, the most elevated portion being down stream. The fish, working their way down the river, meet the partial obstruction caused by the wall, follow its direction to this apex, pass into this trap there formed, and are washed by the current on this inclined plane, or are caged in the pocket beneath. Many thousand small fish, even small enough to pass through the interstices between the slats, are fatally injured by being washed against them by the force of the current, so that not only is there a wholesale destruction of the larger fish taken in the trap, but a large number of smaller ones are injured as above described.

In some counties of the State, the inhabitants being aware of the ill which would result, have secured legislative enactments which prohibits the use of these traps in certain counties; and to a large extent the citizens of Maryland have abandoned their use on the Potomac; but, nevertheless, there are very many of them in use in the river, even in the waters of the counties in which it is illegal. These are generally claimed by residents on the other, or Virginia side.

We trust, that for the welfare of the inhabitants of the upper Potomac, as well as those of the lower Potomac, whose larger interests in the Shad and Herring fisheries are involved, that the long pending dispute as to jurisdiction be settled at an early day, and that the three States interested in the fisheries of this grand river can be induced to pass concurrent legislation.

We are inclined to believe that the obstructions and fish-pots, as above described, have been the most potent causes of the decrease of the Black Bass in certain localities; we, at the same time, are thoroughly satisfied that there is a limit to their productiveness, as with all of these fishes which are dependent on a local supply of food. This food supply would be very materially increased, however, by a proper fish-way over the Great Falls, which would not only enable fishes from the lower Potomac to ascend and increase in the upper waters, many of which would fall a prey to the Black Bass, but the Bass themselves would find some of their subsistence below the Falls, and feed on the brackish water fishes and crustacea which would not find their way above the Falls, and in time they would be enabled to return to the upper waters for the purpose of spawning and passing the Summer months in the cold waters of that region.

Even the adults of most of the Suckers, Chubs and Minnows of the Potomac are small enough to be devoured by the Bass, so that we can readily imagine that their foraging may be extended to a war of extermination, and finally, there would be no adult Chubs or Suckers to reproduce their kind. This possibly, may be successfully avoided by the introduction of the larger varieties of the Sucker family, such as the Buffalo fish of the Ohio and Mississippi regions, the adults of these varieties being much too large to be devoured by the Black Bass, attaining many times the size of even the largest specimens of Bass.

CALIFORNIA SALMON—(*Salmo quinnat.*)

The first work that occupied us was the distribution of the California Salmon, which had been hatched at the Druid Hill Hatching House during the Fall of 1875. As the appropriation for that year had been exhausted, we deemed it advisable to keep the fish then at the Hatching House until the Legislature convened in January, when the Representatives of the people should have an opportunity of examining into the needs of the Commission, and make the necessary appropriation for carrying on the work.

As soon as the appropriation was made we completed the distribution of fish then on hand, which we were able to do in a much more thorough manner than if we had made the distribution with the cramped appropriation of the preceding term.

The several rivers, and the number of fish placed in each will be found in the annexed table of distribution. From this table it will be seen that 268,764 were actually planted in the waters of Maryland, and as these fish were considerably larger than those generally planted, it is hoped that a much larger number of them will reach maturity, and compensate thereby for the cost of keeping them the additional time in the Hatching House.

The system pursued by us has been to place these fish in waters as nearly alike in all respects as possible to those waters in which they were originally found, and put them in sufficient quantities in a few rivers, so that their presence would be felt on their return from the Sea for the purpose of spawning, as it is expected they will do when they reach maturity; that is, in three or four years from the time of their being placed in the stream.

During the months of November and December of the year of 1876, having a very much larger number of young California Salmon, we have extended the distribution very generally throughout the State, including many rivers whose characters are unlike those rivers of the Pacific Coast, of which the Salmon is native. We have included in this year's distribution all the principal rivers on the Eastern Shore, whose waters are salt or brackish through most of their extent.

We are inclined to think, from our experiments, that the Salmon will thrive during its minority in the tide-waters of the Eastern Shore, but whether they will be able to reproduce their kind in those rivers, is a matter that the future must decide. We are inclined, however, to doubt the possibility of their finding proper spawning grounds in those waters ; if so, the supply must be kept up by artificial propagation, which can readily be done, if their introduction into the Potomac, Patuxent and Gunpowder becomes an established success.

On our first trip with California Salmon to the rivers of the Eastern Shore, carrying them in the ordinary transporting cans, on the deck of the steamer Lookout, finding that they were somewhat crowded and distressed, we commenced at North Point to try the effect of a change to salt water. Setting apart a portion of the fish, and adding to these cans the water of the Bay, little by little, until the water became quite salt, to our surprise we found that the fish immediately revived, and became much more active. We were able to keep fish in the cans which had been supplied with the salt water some days without changing, during all of which time they appeared much more active than those which were kept side by side with them in fresh water, which was constantly agitated and freshened.

A few hundred of these fish were brought back to Baltimore, and shipped by rail to Oakland, transported thence to Fort Pendleton, on the North Fork of the Potomac river, without change of water, and when deposited in the river at that point they were lively and in good condition. We afterwards, (to give the experiment of the young Salmon being able to live in salt water a better test, having deposited a number of fish in the Choptank and Pocomoke rivers,) filled the cans with salt water at the mouths of these rivers, and transported this water to the Hatching House at Druid Hill Park, where we placed it in two of the nursery tanks. We then put about 10,000 young fish into these troughs on the

8th day of December, and kept them without change of water until the 19th day of December. During this time, although the fish lived with little or no mortality, they refused to take their ordinary food; but on being removed from the salt water, in twenty-four hours commenced feeding with their usual appetite. During their life in salt water they became somewhat thin, most probably from their want of food, but in other respects no change was apparent in their condition. This experiment has proved that salt water is not so fatal to them when young as has been supposed; we are not satisfied, however, as to the effect the salt water would have, under ordinary circumstances, on their feeding. In the salt water of the Bay, if these fish were at large, they would find a constant motion and circulation; much more air absorbed than when the water lay still in the nursery tanks. During the time they were in the salt water it was exceedingly cold in the Hatching House. The salt water reached a very low temperature, and very much lower than the spring water, to which they were transferred.

In nature, instead of the artificially prepared food, (finely chopped liver) they would find an abundant supply of living animalculae and small crustacea.

We were somewhat surprised to find the Salmon live for any length of time in salt water when so young, as in "Bertrams' Harvest of the Sea," we find the following statement:

> "Mr. William Brown, in his painstaking account of *the natural history of the Salmon*, also bears testimony on this part of the Salmon question:—'Until the parr takes on the smolt scales it shows no inclination to leave the fresh water. It cannot live in salt water. This fact was put to the test at the ponds, by placing some parrs in the salt water—the water being brought fresh from the Sea at Carnoustie; and immediately on being immersed in it the fish appeared distressed, the fins standing stiff out, the parr-marks becoming a brilliant ultramarine color, and the belly and sides of a bright orange. The water was often renewed, but they all died, the last that died living nearly five hours. After being an hour in the salt water they appeared very weak and unable to rise from the bottom of the vessel which contained them, the body of the fish swelling to a considerable extent. This change of color in the fish could not be attributed to the color of the vessel which held them, for on being taken out they still retained the same brilliant color.'"

*Conducted in water from the Chesapeake Bay, the experiments, though imperfect, would indicate that this variety of Salmon (*Salmo quinnat*) is capable of sustaining life under circumstances fatal to the Eastern variety, and indicate also that their establishment in the tidal rivers above referred to, may be possible. We are inclined to believe that in future we will be able to transport the young Salmon, in distributing them, much easier, with much greater safety, and without necessity of a change of water, to distant localities by using sea water; and on their return to fresh water, that they will resume the condition and mode of life which they followed previous to the change from fresh to salt water.

On the 3d of October I received 10 packages, containing each two boxes, each box marked as containing 50,000 eggs, making in all 1,000,000. The crates were kept in an ice house, surrounded by ice, until the 7th of October. They having arrived sooner than expected, the Hatching House was not in order for their reception. On the 7th the unpacking was commenced, and completed on the 12th of October, when all the eggs were laid down in the hatching apparatus. The eggs were well packed and in fine condition, comparatively few having died on the journey, considering the length of time occupied in their transportation from the McCloud river, and the distance traveled.

Up to the night of the 12th of October the loss in eggs was 28,000. I think there were somewhat over 1,000,000, and it is the impression of the men who handled the eggs that the number was somewhat underestimated by those packing them; whereas, in the former shipments, the numbers have been overestimated.

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* Since the above has been in press, I have through the courtesy of Mr. W. C. Coup, proprietor of the New York Aquarium, been able to try the effect on the young Salmon, of their introduction into the salter water of the sea. The water which supplies the tanks which contain his beautiful and instructive collection of salt water fishes, &c., is brought from the sea, several miles below Sandy Hook. I immersed a number of young Salmon in this water in one of his tanks, and found them all dead at the end of six hours. This experiment according with that related in "Harvest of the Sea," above quoted.

On October the 17th two additional packages were received, marked to contain 100,000 eggs each. One of these, by direction of Professor Baird, was forwarded to Colonel Marshall McDonald, at Lexington, the other unpacked and the eggs laid in the hatching apparatus. These were also found in excellent condition. The first lot of eggs was brought from California in a "refrigerating car" to Chicago, and thence distributed by express; the last lot, received on the 17th of October, came by express direct from Redding, California.

By the 4th of November all the eggs were hatched, and on the 6th of November those first hatched were sufficiently advanced to commence their distribution.

The total loss in eggs and young fish from October the 12th up to November the 6th, when they were all hatched, was 74,950; these, with the 28,000 found dead during the unpacking, make a total loss of 102,950 eggs and young fish up to November the 4th.

The total loss in fish from November the 4th to December the 31st was 45,080; which, with loss of fish and eggs already stated, makes an aggregate loss of 148,030. I have retained in the ponds at Druid Hill Park perhaps 100,000 for future distribution and experiment.

During the months of November, December and January the distributions were made as shown in tables accompanying. Those in table marked "A" were placed in waters outside of the State of Maryland. Those placed in the waters of Maryland, and the localities, etc., will be found in table marked "B."

The total distributions accordingly were, to other States 259,800, and in the State of Maryland 784,840; these, together with the fish kept in the ponds for future distribution and experiment, amounting say to 100,000, makes the total number of California Salmon, the produce of those received, 1,144,640. The total loss of eggs and fish at the Hatching House, amounting to 140,030, would indicate that the eggs received were 1,292,670 instead of 1,100,000, as estimated by Mr. Stone.

Of those placed in the waters of other States are included 78,400 placed in the Shenandoah, 16,000 in the Occoquan, and 32,000 in Goose Creek, all tributaries of the Potomac. As these, on their return from the Sea, in their migration up, will be taken by the fisheries on the Potomac, below Washington, the 126,400 Salmon, included in the 259,800 placed in waters out of the State, will be of benefit to the State of Maryland; we may, therefore, estimate that of the fish hatched in the Fall of 1876, Maryland waters will receive the benefit of 911,040, a very large increase in the number of California Salmon, placed in Maryland waters, of those hatched in the Fall of 1875, which amounted, as will appear from the record contained in the annexed table, to 268,764.

The experiment has now been tried on a sufficiently large scale to insure its success, if the introduction of this valuable fish into Maryland waters is possible. Possibly a few of those first placed in these waters may return from the sea during the coming Spring and be taken by our fishermen, but we do not look for the return of the Salmon in any quantities before the Spring of 1878, or possibly '79.

A.—RECORD OF DISTRIBUTION OF CALIFORNIA SALMON,

Made from December 15th, 1875, to April 17th, 1876, by Maryland Commission of Fisheries, under direction of T. B. Ferguson, Commissioner.

No. of Line.	Date of Transfer.		Obtained from.	Place whence taken.	NUMBER OF FISH.		INTRODUCTION OF FISH.			Transfer in Charge of—	REMARKS.
					Originally Taken.	Actually Planted	Place.	Stream.	Tributary of—		
1	Dec.	15	Commissioner of Fish and Fisheries.	Druid Hill Hatch'g House.	7,000	7,000	Savage Station.	Little Patuxent.	Patuxent.	Wm. Wroten.	Met by Mr. Randall.
2		15		" "	7,000	7,000	Patuxent Station.	" "	"	"	
3		15		" "	14,000	14,000	Laurel Station.	Patuxent.	"	Wm. Hamlen.	Above and below Factory Dam, and not in good condition.
4		21		" "	48,500	48,500	Point of Rocks.	Potomac.	Potomac.	Wm. Hamlen and Wroten.	
5		31		" "	15,000	15,000	Sir John's Run.	"	"	Wm. Hamlen.	
6	Jan.	3		" "	15,000	14,500	Savage Station.	Patuxent.	Patuxent.	"	
7		5		" "	10,000	10,000	Tank Station.	N. Patapsco.	Patapsco.	Wm. Wroten.	
8		5		" "	13,000	13,000	Slabtown.	Owens' Creek.	Monocacy.	Wm Hamlen.	
9		5		" "	5,000	5,000	Druid Hill Park.	Druid Hill Lake.	B. Water Wks.	Wm. Hines and Wroten.	
10		7		" "	18,000	18,000	Glencoe.	Gunpowder.	Gunpowder.	Wm. Hamlen.	
11		14		" "	30,000	30,000	Phœnix.	"	"	Wm. Hamlen and Wroten.	
12		24		Green Spring.	500	500	Druid Hill Park.	Druid Hill Lake.	B. Water Wks.	Wm. H. Hines.	Year old Fish.
13		26		Druid Hill Hatch'g House.	5,000	5,000	Weaverton Station.	Potomac.	Potomac.	Wm. Hamlen.	

14	Feb.	10	Spencer F. Baird, United States	Green Spring.	200	164	Cedar Point.	Patuxent.	Patuxent.	Wm. H. Hines.	Year old Fish.
15	March	16		Druid Hill Hatch'g House.	15,000	15,000	Aberdeen.	Tobacco Run.	Deer Creek.	“	
16		16		“ “	500	500	“	Archer's Run.	“	“	
17		16		“ “	500	500	“	Green Spring Run.	“	“	
18		19		“ “	6,000	6,000	Savage Station.	Little Patuxent.	Patuxent.	Wm. Hamlen.	
19		21		“ “	13,000	13,000	“ “	“ “	“	“	
20		23		“ “	2,000	2,000	Tank Station.	N. Patapsco.	Patapsco.	Wm. Hamlen and Wroten.	
21		23		“ “	2,000	2,000	Double Pipe Creek.	Double Pipe Creek	Monocacy.	Wm. Wroten.	
22		23		“ “	3,000	3,000	Slabtown.	Owens' Creek.	Patapsco.	Wm. Hamlen.	
23		23		“ “	4,000	4,000	Hagerstown.	Antietam.	Antietam.	L. Fairfax.	
24		25		“ “	6,000	6,000	Laurel Station.	Patuxent.	Patuxent.	H. Hines and Wm. Hamlen.	
25		29		“ “	16,000	12,000	Fort Pendleton.	N. Branch.	Potomac.	Wm. Hamlen.	
26	April	3		“ “	7,000	7,000	Monkton.	Little Gunpowder.	Big Gunpowder	“	
27		6		“ “	3,200	3,200	Ellicott City.	N. B. Patuxent.	Patuxent.	“	
28		7		“ “	1,000	1,000	Magnolia.	Winter's Run.	Bush River.	Waterville Farmers' Club.	
29		14		“ “	2,000	2,000	Westminister.	Pipe Creek.	Monocacy.	Mr. Herbert Shriver.	
30		17		“ “	2,000	1,900	Rowlandville.	Octorara.	Susquehanna.	Wm. Hines.	
31		17		“ “	2,000	2,000	Williamsport.	Conococheague.	Potomac.	L. Fairfax.	
				Total.......	273,400	268.764					

A.—RECORD OF DISTRIBUTION OF CALIFORNIA SALMON,

Made from November 6th, 1876, *to January* 1*st*, 1877, *by Maryland Commission of Fisheries, under direction of T. B. Ferguson, Commissioner of Fisheries, State of Maryland.*

No. of Line.	Date.		Obtained from.	Place whence taken.	NUMBER OF FISH.		INTRODUCTION OF FISH.			Transfer in Charge of—	REMARKS.
					Originally Taken.	Actually Planted.	Place.	Stream	Tributary of—		
1	Nov.	6	of Fish and Fisheries.	Hatching House.	30,000	30,000	Near Parkton.	Gunpowder.	Gunpowder.	Wm. Hamlen.	
2		8			10,000	10,000	Tank Station.	N. Patapsco.	Patapsco.	Wm. T. Wroten	
3		8			15,000	15,000	Wakefield.	Pipe Creek.	Monocacy.	"	
4		8			25,000	25,000	Mechanicstown.	Owen's Creek.		Wm. Hamlen.	
5		10			30,000	30,000	Pa. line.	Deer Creek.	Susquehanna.	"	
6		10			500	500	Pennsylvania.			Otto Lugger.	
7		14			43,000	43,000	Savage Station.	Patuxent.	Patuxent.	Wm. T. Wroten	
8		14			48,000	48,000	Sykesville.	Patapsco.	Patapsco.	Wm. Hamlen.	
9		21			46,400	46,400	Mount Airy.	N Patuxent.	Patuxent.	"	
10		21			33,600	33,600	Monkton.	Little Gunpowder.	Gunpowder.	Wm. T. Wroten	
11		22			29,600	29,600	Chewsville.	Antietam.	Potomac.	"	
12		22			10,400	10,400	Tank Station.	N. Patapsco.	Patapsco.	"	
13		22			34,400	34,200	Hagerstown, Md.	Conococheague.	Potomac.	Wm. Hamlen.	
14		24			12,800	12,800	Bohemia Bridge.	Bohemia.	Elk River.	T. B. Ferguson.	

15	Nov.	24	Spencer F. Baird, United States Com'r	Druid Hill	22,640	22,640	Frederick.	Sassafras.	Sassafras.	T. B. Ferguson	Fish which had been kept in salt water from the Bay from 24th to 28th, and from 25th to 28th, 2 P. M., without change of water.
16		27			66,000	66,000	Oakl'd, Ft. Pendlet'n	N. Potomac.	Potomac.	Wm. Hamlen.	
17		27			700	700	"	"	"	Wm. T. Wroten	
18	Dec.	1			24,000	24,000	Cockeysville.	Western Run.	Gunpowder.	"	
19		1			24,000	24,000	Laurel.	Patuxent.	Patuxent.	Wm. Hamlen.	
20		6			9,600	9,600	Federalsburg.	Branch of	Nanticoke.	"	
21		6			10,400	10,400	Seaford.	Nanticoke.	"	"	
22		6			9,600	9,600	Hillsborough.	Tuckahoi Creek.	Choptank.	Wm. T. Wroten	
23		6			10,400	10,400	Greensboro.	Choptank.	"	"	
24		8			8,000	8,000	Crisfield.	Pocomoke.	Pocomoke.	"	
25		8			24,000	24,000	New Town.	"	"	"	
26		8			56,800	56,800	Point of Rocks.	Potomac.	Potomac.	Wm. Hamlen.	
27		11			20,000	20,000	Elkton.	Elk.	Elk.	"	
28		11			20,000	20,000	Millington.	Chester.	Chester.	"	
29		15			85,000	85,000	Fort Pendleton.	N. Branch Potomac	Potomac.	"	
30		27			25,000	25,000	Keyser.	Potomac.	"	Geo. F. Findley	
					784,840	734,640					

B.—RECORD OF DISTRIBUTION OF CALIFORNIA SALMON,

Made from December 4th, 1876, to January 11th, 1877, by the United States Commission of Fisheries, under direction of T. B. Ferguson, Commissioner, State of Maryland.

No. of Line.	Date.		Obtained from.	Place whence taken.	Number of Fish.		Introduction of Fish.			Transfer in Charge of—	Remarks.
					Originally Taken.	Actually Planted.	Place.	Stream.	Tributary of—		
1	Dec.	4	States Commissioner of Fisheries.	Hatching House.	9,600	9,600	Near Strasburg.	Cedar Creek.	Shenandoah.	Wm. Hamlen.	
2		4			29,600	29,600	Strasburg.	North Fork.	"	Wm. T. Wroten	
3		4			39,200	39,200	Mt. Jackson.	"	"	Wm. Hamlen.	Portion of these were transported in salt water.
4		13			16,000	16 000	Broad Run Station	Broad Run.	Occoquan.	"	
5		13			32,000	32,000	Rectorstown.	Goose Creek.	Potomac.	Wm. T. Wroten	
6		21			10,000	10,000	Big Spring.	Staunton River.	Roanoke.	"	
7		22			5,000	5,000	Chuck Creek.	French Broad.	Tennessee.	"	
8		22			5,000	5,000	Athens, Tenn.	Eastannalles.	"	"	
9		22			10,000	10,000	Cartersville.	Coosa.	Alabama.	Wm. Hamlen.	
10					20,000	20,000	Ga. R. R. Crossing	Oconee.	Altamaha.	"	
11		28			8,000	8,000	Clarksburg.	W. Fk Monongahela	Ohio.	"	

12	Dec.	28	Spencer F. Baird, United Fish and	Druid Hill	9,900	9,900	Oakland.	Yougheiogheny.	Ohio.	Geo. J. Finley.	
13	Jan.	9			7,500	5,500	Salisbury.	Yadkin.	Pedee.	"	
14		10			5,000	5,000	Near Charlotte.	Catawba.	Santee.	"	A portion of these intended for Neuse river, near Raleigh, but condition of the fish rendered it necessary to put them in the Haw.
15		10			15,000	8,000	Graham, N. C.	Haw.	Cape Fear.	Wm. T. Wroten	
16		10			7,500	5,000	Geffney.	Broad.	Santee.	Wm. Hamlen.	
17		10			7,500	5,000	Tocoa.	Savannah.	Savannah.	"	
18		10			7,500	7,500	Norcross.	Chattahoochee	Appalachicola.	Geo. J. Finley.	
19		10			7,500	7,500	Crawfordsville.	Ogeechee.	Ogeechee.	Wm. Hamlen.	
20		11			5,000	4,000	Branchville.	Edisto.	Edisto.	"	
21		11			3,000	2 000	Near Charleston.	Cooper.	Cooper.	"	
					259,800	243,800					

BROOK TROUT—(*Salmo fontinalis.*)

During the three years that the Commission has been in existence we have done nothing with this much prized fish, for the reasons as stated in our last report, but during that time we have received so many applications from all parts of the State for Trout to stock ponds and streams, from which the Trout has almost entirely disappeared, that we have deemed it advisable to secure a quantity of Trout eggs.

As soon as the young fish are ready for distribution, they will be distributed in accordance with the programme detailed in the following letter, which we addressed to the several editors of the leading papers of the State :

Messrs. Editors :

"We have been induced by the many applications for Brook Trout (*Salmo fontinalis,*) received during the past three years, to secure a number of eggs of this fish which are now in the hatching apparatus at Druid Hill Park.

When hatched and ready for distribution the young will be devoted to the re-stocking of depleted waters of the State. We will be prepared to distribute them during the month of February, and request that applications by those wishing to stock waters with this fish be made to us by the first of February. Those applying are requested to describe accurately the waters to be stocked, extent, locality, source of supply, into what stream or bay they are discharged, character of bottom and water-grasses, kind of fish now inhabiting, etc.

The means at the disposal of the Commission renders it impossible to transport the fish at the expense of the appropriation ; so in all cases they must be transported at the expense of the persons applying for them.

No charge will be made for the fish, but the Commission will decide the adaptability of the waters and localities, and will notify those persons whose applications are approved, of the time and number of fish which will be delivered to them at the hatching house.

In making the apportionments, preference will be given to those wishing to stock public streams, and to clubs organized for the protection of game and fishes in the State.

It is hoped that in course of time, with increased facilities for procuring eggs, we will be able to give to *all* persons wishing them, who will properly distribute the fish, as many as they wish.

We would be glad if those taking an interest in the restocking of our waters would send specimens, either fresh or in alcohol, of fishes large and small, and any other animal life inhabiting their waters, noting the locality from which taken, to No. 192 North Charles street, Baltimore.

By giving publicity to this proposed work of the Commission, you will greatly oblige us and perhaps benefit your numerous readers."

Yours truly,

T. B. Ferguson,
Commissioner.

During the first years of its existence the New York Commission pursued the same course that we have; that is, of only working with those fish that would be of the greatest permanent benefit in the increase of the future fish yield of the State, but recently they have adopted the plan that we now propose, and which we should have adopted last year had we had sufficient means.

LAND-LOCKED SALMON.—(*Salmo sebago.*)

We received a few thousand eggs of this fish—a present from Professor Baird—which were hatched at the Druid Hill Hatching House.

We hope that this fish may find a suitable home in the cold waters of our mountain regions, and being a home-loving representative of the Salmon family, make a permanent abode with us.

The largest lot of this fish which we had, was sent to Oakland, Garrett county, for distribution in that region. We were induced to deviate from our established habit of always sending a trained messenger with every shipment of fish. We placed this lot in the hands of the Adams Express Company, having been advised by the Superintendent of the company in Baltimore that he believed they would be carried perfectly safe; but out of several thousand shipped in good order from

Baltimore, "scarcely 150 reached Oakland alive, and these very weak." They were met and cared for by Mr. Augustus Delawder. We mention this failure, not with a view of making any complaint against the Adams Express Company, whose officers and men have always been ready to advance the work of the Commission, but to show how necessary it is in the difficult task of moving live fish, to have a trained expert accompany them.

SALMON TROUT, OR LAKE TROUT.

(*Salmo namaycush.*)

We received at the Hatching House on the 3d day of January, purchased from the New York State Hatching House, at Caledonia, 30,000 eggs of the Salmon Trout. Of these 22,600 were hatched and distributed, as will appear in record of distribution. These fish were sent to localities which cannot be reached by the migratory species of the Salmon family, until some provision is made for their return by the erection of fish ladders over the now impassable dams obstructing the several rivers. Those sent to Garrett county, and deposited in the tributaries of the Ohio, it is hoped will be of permanent advantage to the inhabitants of that region of the State, whereas the Salmon, with migratory dispositions, would soon pass beyond the State limits, even before they had attained edible size, and would benefit only those living below the impassable falls and obstructions on the Ohio.

We are inclined to believe that these fish can be established in the cold and deep pools in the western portion of this State, and also in the mill-ponds of the northern and eastern parts.

A few specimens that we have raised in the ponds at Druid Hill Park have grown remarkably well.

During this winter it is our purpose to repeat the experiment of their introduction on a yet larger scale.

RECORD OF DISTRIBUTION OF SALMON TROUT,

Made from April 1st, 1876, to April 17th, 1876, by Maryland Commission of Fisheries, under direction of T. B. Ferguson, Commissioner.

No. of Line.	Date of Transfer.	Place whence taken.	NUMBER OF FISH		INTRODUCTION OF FISH.			Transfer in Charge of—	Remarks.
			Originally Taken.	Actually Planted.	Place.	Stream.	Tributary of—		
1	April 1	Druid Hill Hatching House.	2,500	2,500	Oakland.	Yonghiogheny.	Ohio.	M. A. Delawda.	....
2	" 3		3,000	3,000	Munkton.	Little Gunpowder.	B. Gunpowder.	Wm. Hamlen.	....
3	" 6		3,000	3,000	Ellicott City.	N. B. Patuxent.	Patuxent.	" "	....
4	" 7		3,100	3,100	Magnolia.	Winter's Run.	Bush River.	Waterville Farmer's Club.	....
5	" 14		3,000	3,000	Westminster.	Pipe Creek.	Monocacy.	Mr. H. Shriver.	....
6	" 17		4,000	4,000	Rowlandville.	Octoraro	Susquehanna.	Wm. Hines	....
7	" 17		4,000	4,000	Hagerstown.	Conococheague.	Potomac.	Wm. Hamlen.	....
			22,600	22,600					

SMELT.—(*Osmerus mordax.*)

It being our earnest desire to carry out the introduction into our waters of this savory little fish, which was promised and recommended in our last report, we interested Mr. J. R. Shotwell, one of the Commissioners of New Jersey, resident at Rahway, in our behalf.

As soon as the ice sufficiently disappeared from the Raritan river to enable the fisherman at that point to capture the Smelt, Mr. Shotwell telegraphed us, and we immediately, on the 13th of March, went to the Raritan, at New Brunswick, and, under the guidance of Mr. Shotwell, secured at that point 3,425 Smelt, which we transported successfully to this State, and placed 2,125 of them in the Patapsco river, at the Relay House, and 900 in the Elk river, at Elkton; 300 we took to the Hatching House at Druid Hill Park, for the purpose of experiment, and 100 we placed in Bush river, at the grounds of the Baltimore Yacht Club.

The 300 taken to the Hatching House were ready to spawn, the eggs and milt flowing freely.

The morning after they were placed in the nursery tanks, the spawn was found deposited in the troughs in large quantities. Quarts of this spawn was placed in the hatching jars, and treated with great care, having mats prepared of juniper twigs to receive them. We also took quantities of the eggs and milt in the usual manner.

We were unsuccessful in our attempts, and on examination found that the eggs were apparently good, but the spermatozoa in the milt were (of the milt placed under the microscope) dead. The eggs looked well for two or three days, but showed no sign of vitality. We are inclined to think the failure was caused by the transportation of the fish just at the maturity of the spawn and milt; we hope, however, that those turned loose in the streams will re-produce, and that these rivers will be stocked with this very valuable fish.

It is our intention during the coming March to re-visit New Brunswick at the proper season, and not only transport the adult fish to the rivers of Maryland, but make another attempt at their artificial propagation ; we will, however, take the spawn from the ripe fish as soon as they are taken from the water, and after the eggs have reached a certain state of maturity, transfer them to the Hatching House at Druid Hill Park. By this means we hope to introduce the Smelt by thousands instead of by hundreds, to which we would be limited did we confine ourselves to the transportation of the adults alone.

RECORD OF DISTRIBUTION OF SMELT,

Made from March 14th, 1876, to March 25th, 1876, by Maryland Commission of Fisheries, under the direction of T. B. Ferguson, Commissioner.

No. of Line.	Date of Transfer.		Place whence taken.	NUMBER OF FISH.		INTRODUCTION OF FISH.			Transfer In Charge of—	Remarks.
				Originally Taken.	Actually Planted.	Place.	Stream.	Tributary of—		
1	Mar.	14	N. Brunswick.	500	500	Relay Station.	Patapsco.	Patapsco.	Wm. Hamlen.	Died, 1,100 at N. B.
2	"	16	" "	900	900	" "	" "	" "	Wm. T. Wroten.	" 600 " "
3	"	16	" "	900	900	Elkton.	Elk River.	Elk River.	Wm. Hamlen.	....
4	"	18	" "	150	150	Kept in.	Hatching.	House.	....	....
5	"	18	" "	150	150	Howard Co.	Patapsco.	Patapsco.	Mr John Hanson.	....
6	"	24	" "	725	725	Relay Station.	" "	" "	Wm. Hamlen.	....
7	"	24	" "	150	150	Balt. Yacht Club.	Middle River.	Chesap'ke Bay.	Mr. John Robb.	....
				3,475	3,475					

SHAD, (*Aloso sapidissima.*)

The most important of the operations conducted by the Fish Commission, is the multiplication of this valuable fish. During the last year our operations have not been so successful as we anticipated. The season was an unprecedentedly bad one, and the run of fish being very small, the fishermen ceased operations much earlier than usual; and as we were somewhat dependent on the haul-seines for the fish, from which to obtain the spawn, we were deprived of the means of procuring ripe fish just at the season when our operations were most likely to be successful. We had then to depend on the precarious chances of getting ripe spawners and milters together from the gill-nets.

Having been convinced from our past experience, and satisfied from a close examination of the waters of the State, that we could not operate successfully with the apparatus and means then on hand, we deemed it advisable to make a considerably larger outlay for the purpose of conducting the Shad and Herring hatching operations, as well as for the purpose of studying the requirements of the fisheries. The means at our disposal not being sufficient to make the necessary purchases, and to conduct the operations out of the appropriation of the two years which would intervene before the re-assembling of the Legislature, we made arrangements with Professor Baird, United States Commissioner, to furnish him Shad from our hatching camps for distribution to other waters, he agreeing to pay for the fish furnished him ready for transportation.

Having entered into this arrangement with him by which we were assured means sufficient to carry on operations on quite a large scale, we devoted much of the means at our disposal to the purchase of the steamer "Lookout." By means of this steamer, we were able to carry on the work in such a manner as to be able to furnish the United States Government with a large number of fish, some 200,000 of which were deposited by the Commissioner in the head waters of the Potomac.

We have furnished Professor Baird, at his request, with a full and detailed report of the number of eggs taken, and the number of fish hatched at our several hatching stations, he having paid for many of the fish which were turned loose in our waters in addition to those which he placed in the upper Potomac, giving to the waters from which the eggs were taken, a liberal return of young fish, carrying out the system which he has hitherto pursued on the Connecticut river in his Shad hatching operations at that point, as well as on the McCloud river in his Salmon hatching, under the supervision of Mr. Livingston Stone.

The Potomac being the most southern river of Maryland, we deemed it advisable to commence operations on that river, but we found the conditions which surround the fisheries on the Potomac were not well adapted for the propagation of Shad. To make a thorough success of Shad hatching on the Potomac, we are convinced that the usual methods can never be depended upon. The large fisheries operated on the extensive flats where the Shad congregate in their passage up the river—the width of the stream at these points, renders it impossible to protect properly the hatching boxes from the high winds and storms which often occur during the month of May. Those places which are protected from the winds are out of the current, and we found that the eggs did not mature well in the boxes when in still water. Where the eggs can be well hatched there are no fisheries, and where Shad are taken in large numbers it is impracticable to hatch them.

The only success which attended our efforts on the Potomac last season resulted from the gathering of eggs at the different fisheries during the night, and taking them before morning, on the deck of the steamer, to a central point, there to be matured.

It will be seen by the table showing the operations conducted by Mr. Clark, that 686,000 Shad were hatched on the Potomac at Ferry Landing. Of these, 586,000 were turned into the river, and 100,000 shipped to other States. At our solicitation, Professor Baird placed 200,000 of those turned over to him at Havre de Grace for stocking other rivers, in the Potomac at Piedmont.

Should we be able to conduct operations on the Potomac river this season, we will establish a hatching camp in some protected place, and by means of the steamer attend the hauling of the seines at the different points and carry the eggs to this central camp.

Our efforts were more successful at the "Head of the Bay," to which point we moved on the closing of the fisheries on the Potomac. Some fisheries at this point were operated somewhat later in the season than those on the Potomac, and after they ceased, we took advantage of the hundreds of gill-nets, which are nightly laid out on the "Susquehanna Flats," to procure spawn.

We established the hatching camp at Havre de Grace, under the railroad bridge, where the apparatus was somewhat protected by the piers of that bridge, and where the rapid current at that point gave a constant circulation and change of water to the eggs in the hatching boxes.

We also established a camp at Swan Creek, near Spesutie Island. Earlier in the season, however, while we were conducting the work on the Potomac, we had established a camp at Carpenter's Point, in charge of William T. Wroten, one of our trained men, and this was the most successful point of our operations.

Mr. Washington Barnes, who owns the fisheries at this Point, operates throughout the season two large seines, about 1,100 fathoms in length each, and as he appreciated the future benefit to be derived from the artificial propagation of Shad, gave every facility to our men to take the spawn from the ripe fish as these seines were landed.

During the season, as will be seen from the table showing the operations at this point, 1,660,000 fish were hatched. Of these, 822,500 were turned loose in the North-East river, and under our arrangements with Professor Baird, 837,500 were turned over to him for shipment to other waters.

On the closing of Mr. Barnes' fisheries, on the 30th day of May, the men operating at this point were moved to the "Susquehanna Flats," where they were employed in attending the gill-nets, each night collecting eggs, which were taken to the points above mentioned and placed in the hatching boxes until matured. We also kept William Hamlen at the Light House, who operated a gang of boxes there. It will be seen, by reference to the tables, that at this point 459,000 Shad were hatched and turned loose.

We would here return our thanks to the gillers of Havre de Grace and the adjoining country for the assistance which they rendered, and uniform courtesy which we received at their hands. With but a single exception they manifested the greatest interest in our work, and appreciated the future benefit which they would derive from its results.

We are indebted also to Professor Baird for the gratuitous services of many of his trained men, who assisted us materially in gathering spawn when they were at Havre de Grace waiting for fish for transportation. These young men cheerfully aided in procuring eggs, going out nightly with the gillers. They, with the regular employees of the Commission, constituted quite a large and effective force.

As is shown in the tables given, the detailed account of the several hatching stations during the last days of the season, after the haul-seines had "cut-out," we hatched 2,081,000 Shad from eggs procured from the gill-nets alone.

The great difficulty that we encountered in collecting the spawn from the fish taken in gill-nets, was the scarcity of males. Almost any night we procured hundreds of thousands of eggs, which we were compelled to throw away, not being able to obtain the male fish from which to procure milt for their impregnation. This is attributable to the fact that the males are generally smaller than the females, and pass through the large meshes of the gill-nets.

The run of the ripe male fish generally precedes that of the female, and in the early part of the season ripe males are even more abundant than the females, at which time the haul-seines are in full operation, and no doubt the males are much diminished before the close of the hauling season ; this tends to produce a scarcity, and helps to account for the few taken by the gill-nets. We cannot state positively as to the relative proportion of ripe male and female, as taken in the gill nets in the early part of the season, for we only adopted the plan of taking the spawn from the gill-nets after the close of the haul-seine season.

Although the number of eggs gathered, and the number of fish hatched was very much less than we expected, yet the experience which we obtained will enable us during the coming Spring to operate with much greater chances of success.

The surrounding conditions at the "Head of the Bay" are very much more favorable to Shad hatching than those to be found anywhere else in the State, and our principal operations will be conducted at this point during the coming season.

On the 2d of May we established a camp, in charge of William H. Hines, at Bristol Landing, on the Patuxent river, the same point that we operated the year before, but as the catch of fish was so small at this fishery, we deemed it advisable to break up the camp, which we accordingly did on the 12th day of May, hoping that the services of the men there employed would be much more remunerative to the State by moving them to the Potomac river, where the fish were taken in very much larger numbers.

Had we met with the success on this river which we expected, we would have transported by rail a large quantity of fish to the Patuxent, and deposited them in this stream where the railroad crosses it.

We are convinced, from our attempts and failures on the several smaller rivers of the State, that until these rivers can be brought up to their former degree of productiveness, that it will not be profitable to establish camps on them ; that we must increase the Shad of these rivers by hatching them in large numbers at the Head of the Bay, and then transporting the young fish to these rivers after they are hatched.

It is believed that passing their minority in the rivers in which they are placed, they will return to the same stream when mature, for the purpose of spawning. In this way we hope to increase the yield, until this fish is taken in sufficiently large quantities to warrant the establishment of separate camps on each river of importance in the State.

The great difficulty the Commission has met with has been to secure skilled labor, but it has been our aim each year to instruct one or two more of our own citizens in the duties connected with Shad hatching, and it is hoped by the time these rivers are better stocked, that we will have a sufficient number of trained men in the State to multiply the points at which we can conduct operations. It would be of great permanent advantage to the State if each year during our operations in Shad hatching we were able to employ a man from each county in the Shad regions, so that in the course of a few years we could have experts in all portions of the State.

During the season of Trout and Salmon hatching we might also have representatives from the upper mountain regions of our State, who could be trained in the manipulation of the fish peculiar to those regions.

That there has been a very considerable decrease in the yield of the fisheries of the Potomac river, and those on the Chesapeake Bay, is evidenced by the abandonment of very many shores, formerly remunerative to their operators. The alarming extent of this decrease appears more clearly by a comparison of the yield of the fisheries of the Potomac, as given in "Martin's Gazetteer of Virginia and the District of Columbia," published in 1835.* It is stated therein that the number of fisheries on the Potomac in the previous year was

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*We extract this quotation from the report of the United States Commissioner, for the years of 1873 to '74, and '74 to '75, page XVII.

150, and that in six weeks time 22,500,000 Shad and 750,000,000 Herring were taken in this river."

The number of fisheries operated last year was thirty-two, and the yield of the Potomac river, as appears from the statement of the Inspector of Marine Products to the Board of Health, was, during the year ending September 30th, 1876, 319,079 Shad; 1,488,950 Herring; 47,500 Tailors; 483,111 bunches of miscellaneous fish; 919 Sturgeon; showing a difference of 22,180,921 Shad, and 748,511,050 Herring in the catch of these seasons, being forty-one years apart, this too when we recollect that the implements for the capture of fish are very much more perfect now than they were 40 years ago. The fishermen operating with very much larger seines; in some cases on the Potomac hauling them by means of steam engines. To restore these waters to even a comparative abundance, is a matter which should absorb the attention of the Fish Commission. That the means by which we are endeavoring to accomplish these ends are designed to attain the much desired results, is our earnest hope. We do not work without hope and strong faith in the success with which we will finally be rewarded, for everywhere comes to us news of the success which has been vouchsafed to those representing this department in other States, who have been longer at work, while in Maryland the fishing season was a disastrous one to most all of our fisheries, and the catch of Shad smaller than usual. Just the reverse was the case on the Connecticut, where the catch was remarkably good.

The Massachusetts Commissioners' report, on page 16, gives us this cheering intelligence:

"The Shad have been largely increased in the Merrimac, and on the lower part of the Connecticut, the catch during the last season was better than ever before known.

"The head waters of the Merrimac are swarming with young Salmon, while the full-grown fish are making their appearance in both rivers.

"Some 68 great ponds of the State have been stocked with Black Bass, Land-Locked Salmon, and other fish, and, as a natural consequence, all the streams connected therewith are getting their share.

"Black Bass are plenty in the upper part of the Connecticut, and are rapidly increasing in the Merrimac."

The Connecticut, before it was restored by artificial propagation, was so unproductive that the Shad fisheries were almost entirely abandoned.

It is worthy of remark, that whereas the Shad have been increased on the Connecticut river, the Black Bass are reported also plentiful in the upper part of that river. This should also allay somewhat the fears of those interested in the Shad and Herring fisheries, and counteract the prejudices which have been formed against the introduction of the Black Bass, certainly a valuable addition to the fishes of the upper waters, of even the Shad rivers.

NOTE.—We regret that tables showing the operations conducted by Mr. Clark, on the Potomac River at Ferry Landing, and under the Railroad bridge at Havre de Grace, have been mislaid, and duplicates of his reports could not be obtained from Mr. Clark in time to give details in full, a summary of results will be found on pages 43 and 48.

RECORD OF SHAD HATCHING

Operations conducted at Bristol Landing, on the Patuxent River, from May 2d, to May 12th, 1876, on account of Maryland Commission of Fisheries, by Wm. H. Hines.

Line No.	Date.	Hour.	Temperature of— Air.	Temperature of— Surface Water.	Wind. Direction.	Ripe Fish. Males.	Ripe Fish. Females	Eggs Obtained.	Fish Hatched	Fish turned into River.	REMARKS.
1	May 2	7 A.M.	57	53	S. E.	1	1	15,000			
2	3		58	59	N. E.		1	10,000			
3	4		56	59	S. E.		1	20,000			
4	5		59	62	S.		2	35,000			
5	6		66	63	S. W.		3	50,000			
6	7		72	68	S. W.						
7	8		74	71	S. W.		3	70,000			
8	9		63	72	N. E.		1	30,000	50,000	50,000	
9	10		62	66	N. E.				75,000	75,000	
10	11		57	65	N. W.			75,000	50,000	50,000	Eggs in boxes turned into River, and Camp broken up to go to the Potomac.
11	12		60	67	S.						
								305,000	175,000	175,000	

RECORD OF SHAD HATCHING

Operations conducted at Carpenter's Point, on the North-East River, from May 10th, 1876, to May 31st, 1876, on account of Maryland Commission of Fisheries, by Wm. T. Wroten.

Line No.	Date.	Wind. Direction.	Fish Taken.	Ripe Fish.		Eggs Obtain'd	Fish Hatched	Fish turned into River.	Fish shipped to other points.
				Males.	Females.				
1	May 10	N. W.	16	....	......	....	....	....	....
2	11	N. W.	305	....	7	120,000	....	....	....
3	12	S.	199	....	6	120,000	....	....	....
4	13	N.	783	....	9	180,000	....	....	....
5	14	S. W.	....	....	......	....	....	....	....
6	15	Variable.	556	....	8	210,000	....	....	....
7	16	N. E.	107	....	1	25,000	....	....	....
8	17	N. E.	87	....	1	....	....	....	....
9	18	S. E.	143	1	2	40,000	278,000	108,000	170,000
10	19	S.	272	8	9	200,000	183,000	108,000	75,000
11	20	S. E.	337	13	15	225,000	....	....	....
12	21	S. W.	....	....	......	....	....	....	....
13	22	S. W. Stormy	434	4	15	15,000	162,000	162,000	....
14	23	N.	409	5	7	120,000	168,000	168,000	....
15	24	S.	377	9	14	175,000	216,000	46,000	170,000
16	25	S.	77	6	5	125,000	....	....	....
17	26	N. E. & E.	237	7	6	100,000	180,000	105,000	75,000
18	27	S. W.	139	....	......	....	5,000	5,000	....
19	28	Sunday.	....	....	......	....	....	....	....
20	29	S. W.	238	1	10	20,000	265,500	105,500	160,000
21	30	E.	235	2	8	75,000	....	....	....
22	31	S. E.	....	....	......	....	202,500	15,000	187,500
					Total	1,750,000	1,660,000	822,500	837,500

RECORD OF SHAD HATCHING

Operations conducted at Ferry Landing, on the Potomac River, from May 8th, to May 24th, 1876, *on account of Maryland Commission of Fisheries, by F. N. Clark.*

* * * * * * * * * * *

Total Fish hatched	686,000
Total Fish turned loose into River	606,000
Total Fish shipped to other points	100,000

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* Details of Daily Record lost.

RECORD OF SHAD HATCHING

Operations conducted at Swan Creek, the Head of the Bay, from May 26th, 1876, to June 3d, 1876, on account of Maryland Commission of Fisheries, by Wm. H. and J. H. Hines.

Line No	Date.	Hour.	Temperature of Water.			Wind.		Condition of—		Fish Taken.		Ripe Fish.		Eggs Obtain'd	Fish Hatched	Fish turned Loose	Fish shipped to other points
			Air.	Surface Water.	Bottom.	Direct'n	Intensity.	Sky.	Water.	Males.	Females.	Males.	Females.				
1	May 26	7 P. M.	65	69	68	South	......	Clear.	Muddy.	20	3	2	3	50,000	....	......	....
2	27	“ “	67	70	69	“	......	“	Clear.	1	1	1	2	10,000	....	. ....	....
3	28	“ “	67	72	72	“	.....	“	“	......	......	......	.....	....	....	......	....
4	29	“ “	70	73	71	S. East	......	Changeable.	“	. ...	......	3	5	20,000	....	......	....
5	30	“ “	69	72	70	“	Hard	Clear.	“	......	......	1	1	10,000	45,000	......	45,000
6	31	“ “	72	73	73	South	......	. .. .	....	......	......	3	2	20,000	30,000	30,000	....
7	June 1	“ “	73	73	72	S West	.... .	....	....	......	......	......	.....	....	....	......	....
8	2	“ “	73	74	74	......	.....	....	....	......	......	5	8	100,000	50,000	50,000	......
9	3	“ “	....	....	....	......	......	....	....	......	......	......	.....	....	....	......	....
														Total...	125,000	80,000	45,000

RECORD OF SHAD HATCHING

Operations conducted at Swan Creek, at the Head of the Bay, from June 1st, 1876, *to June* 10*th,* 1876, *on account of Maryland Commission of Fisheries, by Wm. T. Wroten.*

Line No.	Date	Wind. Direction.	Fish Taken.	Ripe Fish.		Eggs Obtain'd	Fish Hatched.	Fish turned Loose.	Fish shipped to other points.
				Males.	Females.				
1	June 2	S. W.	27	5	13	100,000	....	....	....
2	3	S.	......	2	5	100,000	....	....	....
3	4	S. E.	43	4	9	35,000	....	....	....
4	5	N. W.	79	6	7	100,000	75,000	....	75,000
5	6	N. W.	57	4	12	205,000	80,000	80,000	....
6	7	S.	63	4	7	90,000	70,000	70,000	....
7	8	S.	4	....	......	....	....	....	....
8	9	....	......	....	......	....	....	....	....
9	10	....	......	....	......	....	300,000	50,000	250,000
						630,000	525,000	200,000	325,000

RECORD OF SHAD HATCHING

Operations conducted at Fishing Battery, on the Susquehanna River, from June 3d, 1876, to June 21st, 1876, on account of Maryland Commission of Fisheries, by Wm. Hamlen.

Line No.	Date.	Temperature of Water.			Wind. Direction.	Condition of—		Fish Taken.		Ripe Fish.		Eggs Obtain'd	Fish Hatched	Fish turned Loose.	REMARKS.
		7 A. M.	12 M.	7 P. M.		Sky.	Water.	Males.	Females	Males.	Females.				
1	June 3							3	10	2	3	35,000			All fish taken in gill nets on Susquehanna Flats.
2	4							2	9	2	5	60,000			
3	5							7	24	5	8	100,000			
4	6							9	14	4	9	150,000			
5	7							3	13	2	2	15,000	90,000	90,000	
6	8														No fish taken on account of freshet.
7	9						Muddy.								
8	10				S.		"						190,000	190,000	
9	11	70	71	73	S. E.		"								
10	12	70	70	73	S. W.		"	3	8						
11	13	68	69	70	S. E.	Clear.	"		2						
12	14	70	70	72	S.	Cloudy.	"	2	1			6,000			
13	15	71	71	72	S. E.	Clear.	"		12						
14	16	73	74	75	E.	Cloudy.	"	6	23	4	5	80,000			
15	17	74	77	77	S. E.	Clear.	"								
16	18	75	75	75	S. E.	Cloudy.	"						4,000	4,000	
17	19	74	75	78	S.	Clear.	"	4	8	3	5	90,000			
18	20	75	74	76	S. W.	"	"						75,000	75,000	
19	21	71	72			"	"						100,000	100,000	
												536,000	459,000	459,000	

RECORD OF SHAD HATCHING

Operations conducted at Havre de Grace, Maryland, on the Susquehanna River, from June 12th, 1876, *to June 20th,* 1876, *on account of Maryland Commission of Fisheries, by J. H. Hines.*

Line No.	Date.	Wind. Direction.	Eggs Obtain'd	Fish Hatched	Fish turned Loose.	REMARKS.
1	June 12	S.				
2	13	S.	100,000			
3	14	S. E.				
4	15	S. E.	40,000			
5	16	S. E.	20,000	70,000	70,000	
6	17	S. E.		30,000	30,000	
7	18	S. E.		10,000	10,000	
8	19	Variable	30,000			15,000 impregnated Eggs left in charge of Mr. Mitchell a Giller of Havre de Grace.
			190,000	110,000	110,000	

RECORD OF SHAD HATCHING

Operations conducted at Railroad bridge, at Havre de Grace, on Susquehanna River, from May 28th, 1876, *to June 14th,* 1876, *on account of Maryland Commission of Fisheries, by F. N. Clark.*

* * * * * * * * * * *

Total Eggs obtained	960,000
Total Fish hatched	862,000
Total Fish turned loose into River	272,000
Total Fish shipped to other points	590,000

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* Details of Daily Record lost.

CARP.

During the year we have, with the consent and assistance of the Park Commissioners of Druid Hill Park, added another large pond to those devoted to the breeding of the European Carp.

We now have in Druid Hill Park, besides the three small nursery or breeding ponds, two large ponds, which have a depth of water from ten to twelve feet; in these are kept the adult fish.

We have met with remarkabe success during the year, and from the small stock of fish brought over by Mr. Hessel and by Mr. Welsher, have increased the number very materially.

During the month of September Professor Baird sent Mr. Rudolph Hessel to Europe, for the purpose of collecting and bringing over the best varieties of European Carp. On his arrival in Hungary he found it impossible to get the fish breeders to draw their ponds, on account of the then exceedingly warm weather, but on the approach of Winter he was enabled to secure an assortment of the most valuable varieties.

He sailed from Bremen in the steamship "Leipzig," on the twenty-ninth day of November, with his live fish cargo, but the steamer being baffled by adverse winds, and having an exceedingly rough passage, did not reach Baltimore until the morning of the twenty-second of December Of the lot only thirty King Tench and seven Carp were alive. The Carp were of the two best varieties known in Europe; two of the variety *Cyprinus specularis*, or Mirror Carp, and five of the variety *Cyprinus nudus*, or Naked Carp, which are destitute of scales.

Mr. Hessel reports that when seventeen days out he had sixty-five Carp in fine condition, but his supply of fresh water being limited, after that time they died rapidly. Those which reached Baltimore alive have been placed in the ponds prepared for their reception. In the Spring, when their breeding season approaches, the eggs will be manipulated with the greatest care. It is hoped, that although the number is very much less than we expected, yet, that we will have a sufficient stock to establish the breed of these varieties in American waters.

We are informed by Mr. Hessel that this variety of Tench, known as the "King Tench," grows very rapidly, and the flesh is much esteemed in Europe.

The Naked Carp (*C. nudus*) is very much more rapid in its growth than any other European variety, attaining a weight of three or four pounds in two years, after which period its growth is even more rapid. Its flesh is flaky, and more highly esteemed even than the European Trout.

We have now several thousand of the variety of Carp, known as "Prussian Carp," (*Carassius gibelio*) the increase from those brought over by Mr. Welsher. It is proposed to distribute these during the coming Spring, as we have not a sufficient number of ponds to keep them separate from the finer varieties recently received. We have also several thousand of the Golden-Ide, (*Idus melanotus*) the progeny of those brought over at the same time with the Prussian Carp.

We cannot, at this time, report the increase of the common Tench, (*Cyprinus tinca*) or of the Golden Tench, (*Tinca auratus*) of the previous importation in charge of Mr. Hessel, as they are in the deep pond, the water of which we have not yet drawn. We cannot overestimate the value of these several importations of European fish to the State of Maryland, and to the country at large, as we are satisfied that they will fill a much needed want of rapid growing edible fish for still and even stagnant ponds.

Although we have not felt any of the practical results, yet the last year has proved the thorough adaptability of the ponds constructed in Druid Hill Park for the purpose for which they are intended.

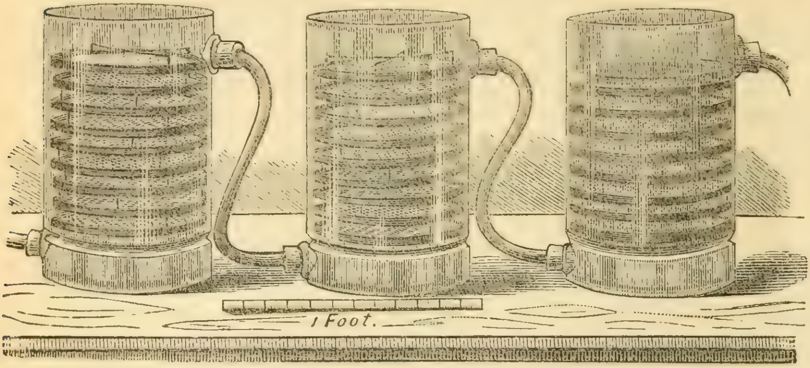
The young fish that we hatched in June and July of last Summer have grown with great rapidity, and are in fine condition. The experience of last year has been at least of great value.

HATCHING HOUSE.

The experience of another season has demonstrated the adaptability to the purpose, and the excellence of construction of the Druid Hill Hatching House.

During the past October we had at one time in the hatching apparatus about 1,300,000 eggs, and these the eggs of the California Salmon, which are larger than the eggs of any of our fishes, and yet the house was not overcrowded. We need, however, considerable more room for nursery tanks, in which to care for the young fish, in case it is necessary to keep them any length of time before their distribution. The necessary addition for this purpose will receive our early attention, and, if possible, space will be secured. The only necessary change to be made in the apparatus as at present constructed, is an extention of the filtering tank, which, through a misunderstanding, was constructed smaller than designed. Our experience has proved the superiority of the glass hatching jars in the ease and comfort with which they can be operated ; the cleanliness and purity is such that we have almost discarded the other forms of hatching apparatus, hitherto used in the Hatching House, and now reserve the hatching troughs to be used as nursery tanks only.

When operating with only a small quantity of eggs, and desiring a more perfect filtration of the water, we frequently use two jars, passing the water through the first jar, filled with gravel and sand, and thence to the second jar. That the form and manner of using these jars may be more clearly understood, we repeat a cut of the apparatus, as published in the preceding Report of the Commission.

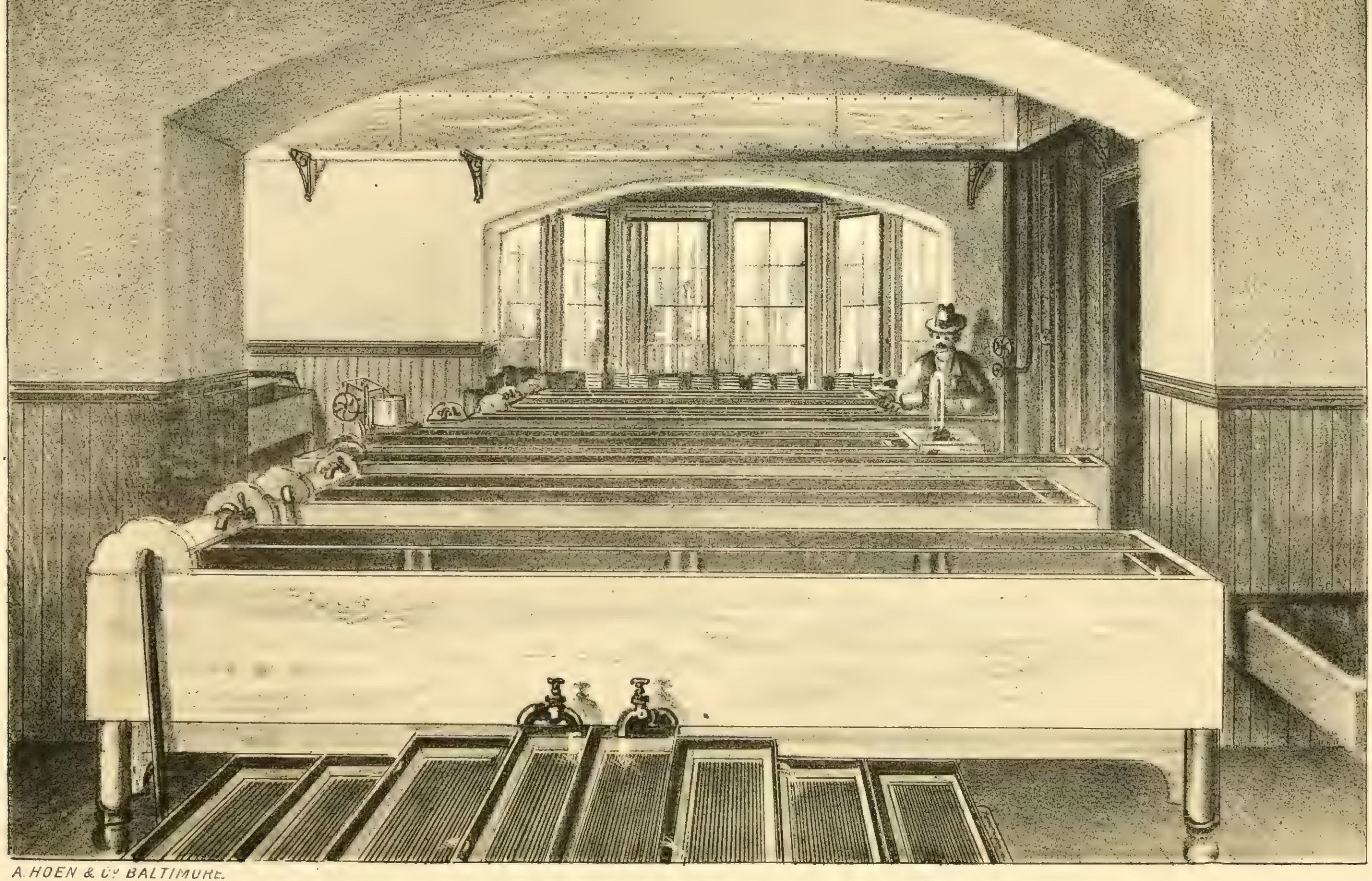


Since the report to the last General Assembly was published, through the kindness of the Park Commissioners, four small ponds were annexed to th Hatching House.

We were fearful that the small supply of water at our command, and the likelihood of its reaching a very high temperature during the Summer would be injurious to the Trout, and fish of this family, inhabiting as they do the colder waters, and that they would not thrive in the ponds. The experience of last Summer, however was gratifying, and demonstrated the feasibility of rearing the Salmonidæ in the ponds prepared for them.

Last Summer was one of almost unprecedented heat, and the hot spells being of protracted duration, nevertheless the fish remained in good health, with very little or no mortality. The fish kept were of the following varieties: the Land-Locked Salmon, the Penobscot Salmon, and the California Salmon.

The California Salmon were of those hatched at Green Spring Trout Farm, in the Fall of 1874, and were, therefore, two years old. The Penobscot and Land-Locked Salmon were hatched in the Fall of 1875; though these latter have not been of rapid growth, yet they are in appa-



A. HOEN & Co BALTIMORE.

INTERIOR OF DRUID HILL HATCHING HOUSE.

rent good health. It was necessary to move these fishes once or twice, in order to complete the ponds in which they were placed, and during the necessary handling in their transfer they became somewhat bruised, and in some instances they were attacked by the Byssus, the spores seeming to attach themselves readily to any bruised place, and once getting established, this plant would grow rapidly, and finally cause the death of the fish on which it fixed itself.

It is our desire to extend and multiply these ponds considerably, so that we will be able to keep a large number and a variety of the fish propagated in the Hatching House.

CENTENNIAL EXHIBITION.

Messrs. John H. B. Latrobe and Samuel M. Shoemaker, Commissioners, representing the State of Maryland at the International Exhibition in Philadelphia, having requested us to co-operate with them in their representation of the resources and industries of the State, we cheerfully undertook to bring together as full a collection of the food products of the Chesapeake Bay, and its tributaries, as the limited time would admit.

Through the assistance of the Maryland Academy of Sciences, who were organized as a corps of trained collectors, we were able to exhibit a pretty full series, in alcohol, of the fishes found in our water, as well as several series of oysters taken from the important beds of the Chesapeake. These latter were peculiarly interesting, as showing the modifications of form, and position of growth to the current, as caused by the different surroundings, depth of water, etc.

We also illustrated, by a series of models, the methods and appliances used in the culture of fish, and the implements and boats used in the capture of fish and oysters, as peculiar to our waters.

The model of the Druid Hill Hatching House was very complete in detail. During the breeding season of the

Salmon family, we hatched several thousand fish in the apparatus exhibited. The process employed, and the Hatching House model, we are informed by the Centennial Commissioners, attracted the attention of many foreign investigators. We are gratified also to learn from them that medals have been awarded to three of the mechanics exhibiting in this department, and that a medal has been awarded to the Maryland Centennial Commissioners "for the collective display of fishes and apparatus."

Our appointment as a Judge in the International Exhibition made it necessary to postpone, until the coming Summer, a thorough examination of the animal life found in our waters, as we deemed it of more importance to take advantage of the opportunity to make a critical and official examination of the various apparatus for fish culture, fish raising, and fish propagation; and the means employed, and the appliances used in their capture, preparation and preservation for consumption, as used by other nations.

The opportunities for the employment of, to us, new means of capture, and the utilization of many of our now wasted resources, made prominent in the exhibition of the products and implements of other nations, we hope to call attention to in a future report. In the abundance of the yield of our fruithful waters we have overlooked many products of value, and much that is now wasted by us is utilized by less favored nations.

LIST OF FISHES.

Feeling how important it is that we should be informed as accurately as possible of the number and varieties of the fishes inhabiting our waters, as the presence—even periodically—of certain fishes often indicate the existence of some food or conditions attracting them, and might enable us to take advantage of their presence and increase our food supply; it is well to state that several species have been found recently whose existence in our waters has not hitherto been suspected.

In the past few years, Pompano, or Carvalle, has been taken in Maryland waters in considerable numbers. Should this fish become one of those regularly taken in the Chesapeake Bay, it will be a very decided addition to the delicacies of our region. When in perfection it is preferred to our deservedly celebrated Bay Mackerel.

I have been informed by a large dealer of Fulton market, that on two occasions the New York market was glutted with the Carvalle, taken in the Chesapeake Bay ; that they sold as low as ten or fifteen cents per pound, when ordinarily they command in the New York market from seventy-five cents to one dollar.

This delicious fish is seldom brought to the Baltimore market, and is little known here. Large catches are often made by fishermen from other States who enter the Bay, fill their vessels, well provided with ice, with the valuable fish of our waters, and take them to New York or Philadelphia. Could this fish become better known by the consumers, and their advent calculated with some certainty by the fishermen, it may yet occupy as important a place as the other luxuries with which our regions are blessed.

By reference to the addition of the list of fishes appended, which was prepared from specimens collected during the last year by Mr. Otto Lugger, the energetic and capable custodian of the Museum of the Maryland Academy of Sciences, it will be seen that twenty-nine species have been added to the list as published last year. Of these, three, namely, the Painted Puffer, (*Cheilichthys testudineus*,) *Trisoiropis*, and the Nurse Shark (*Ginglymostoma cirratum*,) have not been found before in North American waters. These twenty-nine additional species, together with the one hundred and sixty-one enumerated in the report of last year, make one hundred and ninety species known to Maryland waters, representing many of the familes most important as food fishes.

We are indebted to Professor Theodore Gill and other members of the corps of the Smithsonian Institute, for aid in the identification and description of the fishes enumerated. We beg leave to tender our acknowledgments and thanks.

CONCLUSION.

As the General Assembly does not convene until the year from this date, we do not deem it necessary to make any recommendations as to the proper legislation to secure the benefit likely to accrue from the efforts we have made, and are making, to re-stock our waters. We limit this report rather to a simple statement of the work accomplished, and a detail of the plans for the future.

Investigations of another year sustain the belief, that the decrease of our fishes is attributable to the causes enumerated in our last report, and that the remedies are to be found in the suggestions therein contained.

We trust that our fishermen, for their own protection, in the absence of positive and necessary legislation, will avoid a further destruction of fish, and employ the means in their power to check the decrease everywhere apparent.

Many convincing proofs of the certainty of the return of the migratory fishes to the rivers in which they have passed their minority, sustain the theory on which the efforts to re-stock our waters is predicated. It may be well to recite an instance giving unmistakable evidence. Mr. Wilmott, Fishery Officer of the Dominion of Canada, has recently presented to the Smithsonian Institute, a Salmon weighing about fifteen pounds, which was taken this season in a net, near the mouth of Wilmott's Creek. This fish has two easily recognized marks, made evidently with a conductor's punch, one in the second, or adipose dorsal fin, and the other in the tail, or caudal fin. These punch holes are accounted for in the following manner by Mr. Wilmott: He has in this creek, (a small stream, stocked some few years since by him with Salmon, artificially propagated,) a trap into which the fish pass, and are taken on the ascent, for the purpose of spawning. The ripe fish, when ready to spawn, are taken from this trap, and after they are spawned are returned to the water, but are previously marked.

Mr. W. informs us that he marks them the first year that they are handled, by punching a small hole in the adipose dorsal; the second time by punching a similar hole in the caudal.

The two marks above referred to in this fish, are evidences that it has passed through Mr. Wilmott's hands for two different seasons, and was on its return to its natural stream when taken in a net near the mouth. Possibly the Shad would tell the same tale, if the delicate scales of this fish would admit of its being handled and marked, and it would demonstrate the separate and peculiar interest which each and every community has in the increase and preservation of their fish.

As very many of our fishermen have solicited copies of the report of last year for the use of the Code of Fish Laws, compiled from enactments of many years, which repeal and re-enact, with amendments, laws regulating the fisheries, we have appended to this report, for the benefit and use of our fishermen and those who are most interested in knowing what the law is, the additional enactments, as passed by the last General Assembly.

Respectfully submitted,

T. B. FERGUSON,
Commissioner of Fisheries.

ADDITION

TO

LIST OF FISHES

OF MARYLAND,

Published in Report January 1, 1876.

EXPLANATIONS AND ABBREVIATIONS.

ACAD. COLL. signifies that specimens are in the Maryland Academy of Sciences.

S. I. Specimens are in the Smithsonian Institution, at Washington.

FINS.—D. Dorsal, *i. e.*, on the back; sometimes two in number.

P. Pectoral; attached behind the gill-covers.

V. Ventral; attached to the lower side in front.

A. Anal; attached to the belly near the vent.

C. Caudal; the tail fin.

III—TETRODONTIDÆ.

CHEILICHTHYS, Muell.

C. testudineus.

Painted Puffer.

Minute spines, which very readily detach themselves, cover the back from the interorbital space to near the dorsal fin, and the abdomen from the throat to the vent, the dorsal and abdomen spiny patches being connected by a transverse stripe of spines behind the pectoral fin, the snout, sides and tail being naked. Snout rather produced, the eye being nearer to the root of the pectoral fin than to the end of the snout. Distance of the nostril from the eye not much less than the diameter of the latter. Interorbital space generally concave; the diameter of the eye is $\frac{2}{3}$ of the width between the bony orbital edges. The gill openings form a small arch at base of the ventrals. Length of the caudal equal to its distance from the dorsel fin. Sides sometimes with small tentacles. Brownish black above, with whitish lines, the anterior of which are transverse, (on the head and nape); one or two concentric circles in front of the dorsal fin. Sides yellowish, with small rounded brown spots. Abdomen and fins immaculate. The lines on the back are more regular in young than in old specimens, which sometimes have the back and sides irregular marked and spotted with brown or black. Length, 8 inches.

Fin-rays:—D. 9; P. 15; V. 0; A. 7; C. 8^1_1.

Tetrodon testudineus, Guenther VIII, p. 282; Linn. Amoen. Acad. I p. 309, tab. 14, fig. 3; and Syst. Nat. I p. 410.

— *geometricus*, Bl. Schn. p. 508.

Tetraodon ammocryptus Gosse. Nat. Soj. Jamaica, p. 287.

— *bajacu*, Casteln. Anim. Am. Jnd., Poiss. p. 98, pl. 47. fig. 3, (not good.)

Anchisomus reticularis, (Kaup.) Richards. Voy. Herald, Fish p. 161, pl. 31.

Holocanthus leionothos, Gronov. Syst. ed. Gray, p. 24.

Tetrodon punctatus, Poey, Repert Fis. nat. Cub. 1868, p. 432.

A single specimen of this fine fish was obtained in the southern part of the Chesapeake Bay. It is well known to occur in the West Indies, and farther south, but thus far this is the only instance reported of its being found so far north, (Hatteras Inlet.)

ACAD. COLL.

V—BALISTIDÆ.

BALISTES, Linn.

B. capriscus.

The Turbot, European File Fish, Dusky Balistes.

Body oblong, elliptical. Back regularly arched; the facial profile descending obliquely, and slightly curved to the prominent mouth. Depth of the body to its length nearly as one to two; the length from the snout to the branchial aperture, as one to four and a quarter of the total length. Body covered with scales, which are rhomboidal, occasionally triangular or of an irregular shape, with their surface covered with minute, slightly elevated, rounded tubercles, occasioning a rough feel to the touch; they are arranged in obliquely decussating series over the whole head and body, and in parallel series along the bases of the dorsal and anal fins, forming a sort of sheath. There are about 32 scales from the origin of the dorsal fin to the vent. A patch of 4 or 5 unusually large scales is behind the gill-opening. Eyes large, near the facial outline, and slightly in advance of the first dorsal ray. Nostrils oblong, covered by a membrane; mouth small; jaws nearly equal, and covered with thin membranous lips. Sixteen teeth above and below. A single spine between the first and second dorsal fin. The first dorsal fin is composed of two spines, which are entirely concealed in a deep groove. Second dorsal fin long, triangular. Pectorals short and rounded ; the base under the second dorsal spine. The pelvic bone terminates in a short and broad spine, truncated at its tip. Contiguous to this spine arises a low ventral fin, containing seven short bifid spinous rays, at the base of each of them, on each side, is a short horizontal spine. The anal fin arises underneath the seventh ray of the second dorsal, which it resembles in shape and size. The tail is oblong, narrow in the middle, enlarged as the base of the rays. The wide caudal fin has a double and broad emargination ; in old specimens the caudal lobes are produced. Blackish or dull brown above, lighter on the side ; young specimens have numerous small dark brown spots. Length, 12 inches.

Fin-rays :—D. 2, 1, 28 ; P. 14 ; V. 7 ; A. 25–26 ; C. 12.

Balistes capriscus, Gm. L. I. p. 1471 ; Lacep. I. p. 372, pl. 13, fig. 3.

—*fuliginosus*, DeKay, New York Fauna Fish, p. 339, pl. 57, fig. 188.

— *castaneus*, Richards Voy. Sulph. Fish, p. 126, pl. 59, figs. 5–6.

Occasionally met with on the coast of Worcester county.

ACAD. COLL. (Hatteras Inlet.)

CERATACANTHUS, Gill.

C. aurantiacus.

Orange File Fish.

Body subovate, much compressed. Facial line slightly concave ; mouth prominent. Dorsal outline between the spine and dorsal fin, horizontal. Abdomen tumid. Surface covered with minute, acute, incurved prickles, which are felt opposing the hand in all directions, and extend along the rays of all the fins. Very small naked furrows may be perceived with a lens, traversing the surface, and separating the spiny prickles into minute patches or plates. Depth of body about two-fifths of the total length, (without caudal.) The lower jaw of the moderately produced snout is longest, and armed with eight thin flattened teeth, of which those in front are long and large, with emargined edges ; the teeth in the upper jaw are smaller, flat and lanceolate. Eyes large, lateral ; they are placed immediately beneath the dorsal spine and at some distance below the upper profile. Branchial aperture oblique and linear. Nostrils single, oblong, and placed nearly on the plane of the upper margin of the orbits. The dorsal spine is rather feeble, above the middle of the orbit ; it has a small membrane attached to the posterior portion of its base, with a furrow behind it for its reception, when it is recumbent. Like the cat-fish, this spine becomes fixed at the will of the animal. The second dorsal is long and low. Pectorals short, broad and rounded, placed beneath the eyes. The anal fin corresponds in shape and size with the dorsal, but extends behind it. The tail is oblong, linear, compressed, supporting a caudal fin composed of robust rays, of which the central and lateral ones are longest, thus producing a double emergination on its boarder. Chin, lips sides and beneath bluish white ; the remaining parts of the body of a rich orange-yellow. Margins of pectoral, dorsal and anal fins edged with dusky. Length, 18 inches.

Fin-rays :—D. 1, 36 ; P. 12 ; V. 0 ; A. 39 ; C. 12.

Balistes aurantiacus, Mitch. Lit. & Phil. Trans. New York, I. p. 468, pl. 6, fig. 1.

Monocanthus aurantiacus, DeKay, New York Faun. Fish, p. 333, pl. 57, fig. 186 ; Storer, Mem. Am. Acad. VIII, 1861, p. 423, pl. 34, fig. 3.

This fish is not uncommon in the southern part of the Chesapeake Bay.

ACAD. COLL. (Smidt Isl.)

Xa—FISTULARIIDÆ.

FISTULARIA, Linn.

F. tabaccaria.

Tobacco Trumpet Fish, Unarmed Trumpet Fish.

This curious fish has an elongate, cylindrical, slightly rough body. The head is produced into a long depressed tube of horny consistence, terminating in a mouth of moderate width, and is contained three times in the total length, (exclusive of caudal filament.) The very prominent lower jaw terminates in a fleshy knot; the upper lip is very distinct, and is separated from the intermaxillary by a deep groove. Jaws and palatine bones are armed with small teeth. The elongate, ovate eye is much longer than high, and is protected by prominent angles of the frontal bones. The lateral line commences just above the posterior portion of the opercle, is curved towards the medium line of the back, running along the whole length of the dorsal shield, and then bends downwards, proceeding along the middle of the lateral band. On the posterior half of the body it becomes covered with a series of elevated carinated plates. The caudal fin is deeply forked; its two middle rays are produced into an exceedingly long filament, like a whip-lash, giving the fish a very odd appearance. The upper parts are reddish brown, variegated with numerous blue spots, and a narrow bluish longitudinal band along the sides. Abdomen light colored. Length of captured specimens, 5 inches.

Fin-rays ;—D. 16 ; P. 15 ; V. 6 ; A. 16 ; C. 16^3_3.

Fistularia tabaccaria, L. Mus. Ad. Fried. I, p. 515 ; Bloch, VIII, p. 126,. tab. 387, fig. 1.

A small specimen of this odd looking fish was obtained in the inlet between Assateague and Wallops Island. Its motion in the water was rather awkward and slow.

ACAD. COLL.

XII—PLEURONECTIDÆ.

HIPPOGLOSSUS, Cuv.

H. americanus.

The Halibut.

Body flat, elongated. The length of the head equal to one-fourth the length of the entire fish. Eyes large, oblong; their longest diameter equal to the distance between them. Lips large and fleshy; lower jaw longest. The jaws are furnished with two rows of strong, sharp teeth, the inner of which is larger and incurved. Nostrils double; the anterior is tubular, the posterior the larger. The lateral line commences at the posterior angle of the operculum, and, making a high curve above the pectorals, assumes just back of their posterior extremity a straight line, which is continued to the rays of the caudal fin. The dorsal fin arises over the anterior third of the eye, and terminates at the fleshy portion of the caudal fin. The highest rays of this fin are six times the height of those above the base of the pectorals. The pectorals arise just back of the posterior angle of the operculum. Ventrals small, and situated beneath the base of the pectorals; third ray longest. The anal fin arises beneath the posterior half of the pectorals, and terminates opposite the dorsal fin. Entire right side almost uniform dark brown; left side pure white. The fish grows to a very great size; specimens weighing nearly 500 pounds have frequently been taken.

Fin-rays:—D. 99–100; P. 16–17; V. 6; A. 73–74; C. 17–18.

Pleuronectes hippoglossus, L. Syst. Nat. p. 456; Mitch. Trans. Lit. & Phil. Soc. of N. Y., I. p. 386.

Hippoglossus vulgaris, DeKay, N. Y. Fauna. Fish, p. 294, pl. 49, fig. 157.

This fish is occasionally found in the ocean, near the coast of Worcester county.

POMATOPSETTA, Gill.

P. dentata.;

The Summer Flounder. Toothed Flat Fish.

Figure elliptical. The height of the body is one-half of the total length, (without caudal); the length of the head one-fourth. Mouth very large. Upper jaw slightly projecting over the lower, and both furnished with a single row of prominent sharp teeth, separated from each other, so that when the mouth is closed, the teeth of one jaw shut into the space between those of the opposite jaw. The lower jaw has a blunt spine at the chin. Lips small. Eyes separated by a bony ridge, covered with scales similar to those over the whole head. The lateral line is scarcely bent above the pectoral. The dorsal fin commences over the eyes; the anal behind the middle of the pectorals; pectoral half as long as the head. Reddish brown, or pale brown, on the right side, without lines or spots. Pupils black; irides golden. Edge of the anal and dorsal fins bordered with white. Length, 20 inches.

Fin-rays :—D. 91; P. 11; V. 6; A. 70; C. 18.

Pleuronectes dentata, Mitch. in Lit. & Phil. Trans. New York, I, p. 390.

Platessa dentata, Storer. Fish, Massach. p. 143.

Hippoglossoides dentatus, Guenther, Brit. Fish. IV, p. 406.

Specimens have been occasionally taken along the coast of Worcester county.

XIIa—GADIDÆ.

GADUS, Artedi.

G. morrhua.

Common Cod-Fish.

This fish is well known as Cod-fish, Cabeljau, (old and fresh,) Stockfisch, (dried,) or Laberdan, (salted.) The height of the body is less than the length of the head, which is two-sevenths of the total, (without caudal). Snout more than twice as long as the eye, obtuse ; with the upper jaw longest. Barbel rather long, as long as, or longer than, the eye, which is one-seventh of the length of the head, and one-half, or rather more than one-half, of the width of the interorbital space. The vent is situated vertically below the anterior rays of the second dorsal. The two anal fins separated from each other by an interspace. Greenish or brownish olive, with numerous yellowish or brown spots on the back and on the sides. Length, 1 to 3 feet.

Fin-rays :—D. 13, 16–19, 17–19 ; A. 18–19, 17–18.

Gadus morrhua, L. Syst. I, p. 336 ; Mitch. Lit. & Phil. Trans. New York, I, p. 367 ; Richards. Faun. Bor. Amer. Fish, p. 242 ; Cuv. Regne. Anim. Ill. Poiss., pl. 106, fig. 1.

Specimens have been taken in the ocean on the coast of Worcester county.

MELANOGRAMMUS, Gill.

M. æglefinus.

The Haddock.

Body robust, large in front, tapering behind. The height of the body is less than, or equal to, the length of the head, which is contained thrice and four-fifths in the total length, the caudal rays not included. Scales small, elliptical, feebly radiate, striate. Lateral line high up, and irregularly concurrent with the dorsal outline. Head large, slightly carinated at the nape ; broad, and slightly convex between the eyes. Snout conical, prominent. Eyes large, and placed high up near the facial outline. Nostrils double, longitudinally oval, contiguous, the upper slightly anterior, somewhat smaller, and with a valvular membrane. Lips thick and fleshy. The lower jaw shortest, with a single row of short minute teeth ; the upper jaw with a band of very short minute teeth. A single, short and very small barbel under the chin. The vent is situated vertically below the origin of the second dorsal fin. The first dorsal fin is triangular, the third ray longest; higher than long, and higher than the other dorsal fins; its origin over the base of the pectorals. The second dorsel fin longest, arising slightly anterior to a point vertical to the vent; the third triangular, and almost continuous with the second. Pectorals large. The first anal fin longest; the second arises under the third ray of the last dorsal. Caudal with its margin concave. Above the lateral line blackish brown; below silvery grey; the line itself jet black. One or more large, dark, vertically oblong blotches across the lateral line. Pupils black; irides bluish, mixed with reddish. Dorsal and caudal fins bluish, lighter along their bases. Length, 20 to 22 inches.

Fin-rays:—D. 14–16, 20-24, 19–21; P. 21; V. 6; A. 24–25, 21–22; C. 34^{8}_{8}

Gadus gœlefinus, L. Syst. Nat. I, p. 435; Mitch. Lit. & Phil. Trans. New York, I, p. 370.

Morrhua gœlefinus, Storer. Fish. Massach., p. 124; DeKay, New York Fauna. Fish., p. 279, pl. 43, fig. 138.

This fish is found every year in the Atlantic, along the coast of Worcester county, but not in large numbers, it being strictly a more northern form.

UROPHYCIS, Gill.

U. regius.

Spotted Codling.

This fish has a cylindrical, subfusiform body. The height of the body is a little less than the length of the head, which is nearly one-fourth of the total, (without caudal fin). Head small; snout obtuse, rounded, somewhat depressed, with the upper jaw overlapping the lower, rather longer than the eye. Jaws, palate, and throat armed with narrow bands of cardiform teeth. Barbel under the chin, small. The head is covered with small scales, except on the lips. The operculum terminates in a stiff, longish point. Scales soft and very deciduous. Lateral line alternately black and white. The anterior dorsal fin is higher than long, and commences immediately behind the vertical from the roots of the pectorals. The margins of the second dorsal and of the anal fin are even, slightly rounded behind, the latter fin being somewhat the lower. Caudal subtruncated. Pectorals two-thirds as long as the head. Ventrals reduced to a single long ray, bifid at its end. Back and sides pale brown or whitish, with lines between the scales; neck and belly dull white, with suffusions of cream color. The first dorsal marked above with a black spot, surmounted by the white tips of the rays. Some individuals have an imperfect whitish straight fillet under the lateral line. Anal fin brownish, edged with blackish. Length, 10 inches.

Fin-rays:—D. 9, 48; P. 13; V. 1; A. 56; C. 23.

Enchelyopus regalis, Bl. Schn. p. 53.

Gadus punctatus, Mitch. Trans. Lit. & Phil. Soc. New York I, p. 372, pl. 1, fig. 5; Richards. Faun. Bor. Amer. Fish. III, p. 253.

— *blennoides*, Mitch., l. c. p. 370.

Phycis punctatus, DeKay, N. Y. Faun. Fish. p. 292, pl. 46, fig. 149.

A single specimen of this fish was obtained in the southern part of the Chesapeake Bay, (off Kent Island.) It is reported to be not uncommon during some years, and chiefly after a severe winter.

ACAD. COLL.

XIIb—XIPHIDIONTIDÆ.

MURÆNOIDES, Lac.

M. mucronatus.

Common Butter Fish.

Body elongate, linear, much compressed. The height of the body is contained nine times or nine times and a half in the total length, the length of the head eight times and a half. Snout short, with the cleft of the mouth very oblique; the width of the interorbital space is less than the diameter of the eye. Teeth acute, distant in both jaws, and a small group on the vomer; lower jaw, when extended, longest. No scales, nor lateral line. Body covered with a thick coating of mucus, of the consistence of butter, from which is derived its popular name. A single long, subequal dorsal fin, commencing above the branchial aperture, and extending nearly to the base of the caudal; it is composed of a very thick membrane, supported by from 75 to 81 sharp spinous rays. Pectorals rounded and feeble, not quite half so long as the head. Beneath these, and slightly in advance, is the ventral, composed of one very short spine and one ray. The anal is nearly equal throughout its whole extent, not as high as the dorsal; it approaches still nearer to the caudal than the dorsal fin. The two anterior rays are short acute spines, the remainder soft and flexible. Caudal fin rounded. General color greyish, with a series of oval vertical dusky rings along the sides. Abdomen greyish white, tinged with yellow. Dorsal fin grey, with from ten to fourteen black vertical distant stripes. Pectorals and caudal yellow. Anal fin greenish grey, with alternate darker stripes. Length, 3½ to 4½ inches.

Fin-rays :—D. 76–81; P. 12; V. 1, 1; A. 2, 39–44; C. 18.

Blennius gunellus, L. Syst. I, p. 443; Richards. Faun. Bor. Amer. Fish. p. 91.

Gunellus ingens, Storer, Boston Jour. Nat. Hist. 1850, VI, p. 261, pl. 8, fig. 1.

Ophidium mucronatum, Mitch. in Lit. & Phil. Trans. New York, I, p. 361.

Gunellus mucronatus, Cuv. & Val. XI, p. 427; DeKay, New York Fauna. Fish., p. 153, pl. 153, pl. 12, fig. 36.

This peculiar, and with its slimy coat certainly not very handsome, little fish is found occasionally in the drains along the coast of Worcester county. It moves very slowly about the stones and shells, that cover the bottom in such places, but is very active when disturbed, darting away with great rapidity.

XIV—BLENNIIDÆ.

CHASMODES, Cuv. & Val.

C. boscianus.

Six Banded Chasmodes.

This peculiar small fish has an oblong, naked body. Head thick; its length in the total length as one to three and a half. Mouth excessively cleft, and extending to the posterior margin of the orbit. Snout slightly produced, with the upper profile oblique. Teeth very fine, and crowded together like the teeth on a fine comb, on the anterior part of the jaws; those above are blunt-pointed, and about 50 in number; those below are acute, recurved, and of about the same number; no canines. Lateral line indistinct, and obsolete behind. The aperture of the branchial rays is reduced to a small opening above the base of the pectoral. The dorsal fin is equal throughout its whole length, and equals in height one-third of the depth of the body; it unites with the caudal upon one-quarter of the latter fin. The anal fin is distinct from the caudal; it commences about the middle of body. Ventrals two-rayed, with a filamentous termination, and about one-sixth of the total length. Caudal fin rounded. A very small tentacle (often absent) above the orbit. Greyish, with brown colored clouds, forming sometimes six broad, clouded, vertical bands. Length, 2 to 3 inches.

Fin-rays:—D. 29; P. 14; V. 2; A. 19; C. 15.

Blennius bosquianus, Lacep. II, pl. 13, fig. 1.

— *pholis*, Mitch. Phil. & Lit. Trans. N. Y. I, p. 374.

Chasmodes boscianus, Cuv. & Val. XI, p. 295, pl. 327; Dekay, New York Faun. Fish. p. 151, pl. 24, fig. 73.

This peculiar fish seems to be rather common in many parts of the Chesapeake Bay, in localities where oysters are found. All the specimens were obtained from different oyster-bars, and invariably inhabiting the dead and empty oyster-shells, called "snuff-boxes." When taken out of their retreat, they move about very slowly in the water, but show great activity when disturbed. They drop from the shell very promptly, as soon as the oyster is taken out of the water.

ACAD COLL.

XXII—LABRIDÆ.

TAUTOGOLABRUS, Guenther.

T. adspersus.

Burgall or Bergall. Cunner or Conner. Chogset. Blue Fish or Blue Perch.

Body elongated, compressed. The height of the body is equal to, or rather more than, the length of the head, and is contained three times and one-third or three times and two-thirds in the total length. Scales large, adherent, subquadrate, rounded on the exposed margin; five or six series of small scales on the cheek. Lateral line near the back, concurrent with it, and not much curved, descending rather suddenly opposite the termination of the dorsal fin. Head gradually sloping; the facial line slightly convex before the dorsal fin. Opercle with a large and obtusely pointed membrane. Preopercle finely denticulated on its posterior margin. Mouth protractile, with fleshy lips. A series of sixteen to eighteen acute teeth in the upper, and from twenty to twenty-two in the lower jaw; those in front somewhat recurved. The dorsal fin commences with a short spine, nearly above the gill openings; the first eighteen rays are spinous, lower in front, and very gradually increasing in length; the remaining ten rays are branched, higher, with a rounded margin to that part of the fin, nearly conterminous with the anal fin. Pectorals broad and rounded. Ventrals just behind the pectorals, with one stout spinous ray. Anal fin longer than high, with three stout spines. Caudal short and rounded; its base covered with scales. Colors very variable. General color blue, more or less mixed with brown; faint dusky transverse bars occur frequently. Length, 6 to 12 inches.

Fin-rays:—D. 18.10; P. 15; A. 3.9; C. 15^{2}_{2}.

Labrus burgall, Schoepf. in Schrift. Gesellsch. Naturf. Freunde, VIII, p. 155.

— *chogset*, Mitch. in Trans. Lit. & Phil. Soc. N. Y. I, p. 402, pl. 3, fig. 2.

Ctenolabrus chogset, Cuv. & Val. XIII, p. 237.

— *cæruleus*, Storer, Synops. Fish. N. A. p. 134; DeKay, New York Fish. p. 172, pl. 29, fig. 93.

Not uncommon in the Atlantic coast of Worcester and adjoining counties.

XXIVa—TRICHIURIDÆ.

TRICHIURUS, Linn.

T. lepturus.

The Silvery Hair-Tail.

This fish has a long and compressed body, the tail tapering very gradually to a fine point. The skin is smooth, silvery, apparently without scales, and is easily detached. The greenish yellow lateral line arises on the upper part of the branchial aperture, passes down behind the pectorals fin, descends thence to the lower third of the body, and runs parallel and near the edge of the abdomen to the extreme tip of tail. The head is flattened between the eyes, and ridged on the nape towards the dorsal fin. The eyes are large, circular, and prominent, and less than their diameter apart. The larger lower jaw has distant, acute teeth, of which the two anterior are largest, extending outside of the tip of the upper jaw, when the mouth is closed. The opercle ends in a point, extending beyond the base of the pectoral fin, and terminates with its upper margin in a fibrous thread. The dorsal fin, commencing above the upper angle of the gill-opening, is slightly elevated in the middle, where it is nearly two inches high, and disappears gradually in the skin near the tip of the tail; it is composed of flexible, feebly spinous rays. The pectoral fins are broad and obtusely pointed. No trace of ventral fins. About 120 spines, sensible only to the touch, occupy the place of an anal fin. Whole surface silvery. Length, 2 to 3 feet.

Fin-nays:—D. 135; P. 11.

Trichiurus lepturus, L. Syst. Nat. I, p. 429; Bl. Schn. p. 517; Cuv. & Val. VIII, p. 237; Storer, Boston Journ. IV, p. 181; DeKay, New York Fauna, Fish., p. 109, pl. 12, fig. 35.

— *argenteus*, Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 364.

This fish seems to be rather rare in Maryland waters. Only two specimens have been taken near Wallops Island, but both good sized. Fishermen, as a rule, seem not to care much about the small fry, that get entangled between the sea-weeds, and many fish, that may be common enough, are not recognized by them at all, or stated to be of uncommon occurrence.

Acad. Coll.

XXV—SCOMBRIDÆ.

ORCYNUS, Cuv.

O.s ecundi-dorsalis.

American Tunny, Albicore.

Form elongated, fusiform. The height of the body is $4\frac{1}{4}$ of the total length; the length of the head four times. Jaws, when closed, nearly equal. Tongue large and broad. Gape of the mouth very large. Eyes circular. Gill covers smooth, and very large. First dorsal fin with very robust rays; its first ray long, and from this the rays gradually diminish in length; this fin, when recumbent, is concealed in a deep groove. The second dorsal rises shortly behind the first, is very robust and triangular; behind this are nine finlets. Pectorals falsiform, very long, reaching nearly to the end of the spinous dorsal. Ventrals beneath the pectorals, in a groove at their basis. Anal fin posterior to the second dorsal; posterior to this nine finlets. Caudal fin lunated. Upper surface bluish-black; sides silvery; beneath white. Gill covers silvery grey. Finlets bright yellow. Length, 9 to 12 feet.

Fin-rays:—D. 14, 13+IX; P. 34; V. 1, 5; A. 2, 12+IX; C. 19.

Scomber thynnus, L. Syst. I, p. 493; Bl. tab. 55.

Thynnus vulgaris, Cuv. & Val. VIII, p. 58, pl. 210; Cuv. Regne Anim. Ill. Poiss. pl. 45, fig. 2; Storer, Fishes of Massach. p. 47; DeKay, New York Fauna, Fish. p. 105, pl. 10, fig. 28.

— *thynnus*, Guenther, II, p. 362.

Belongs to the Ocean adjoining our coast, and is a well-known inhabitant of the Atlantic.

XXV —CARANGIDÆ.

DECAPTERUS, Bleeker.

D. macarellus.

Mackerell Scad.

The height of the body is $6\frac{1}{2}$ of the total length; the length of the head $5\frac{1}{2}$. The lateral line is nearly straight, covered anteriorly with a series of round scales, posteriorly with twenty-five small plates. Opercular spot small.

Fin-rays:—D. 8^{1}_{33}, I; A. 2^{1}_{27}, I.

Caranx macarellus, Cuv. & Val. IX, p. 40.

PARATRACTUS, Gill.

P. pisquetos.

Yellow Crevalle.

This fish has an elongated, compressed body. The scales are small, caducous, concentrically striate, and extend over the suborbitals. The lateral line is bent downwards below the origin of the second dorsal; its plates (about 46) are well developed along all the straight portion. The height of the body is $3\frac{1}{2}$—$3\frac{2}{3}$ of the total length; the length of the head $4\frac{1}{2}$, and nearly equal to that of the pectoral. Lower jaw longest, with a single series of minute teeth; the teeth in the upper jaw are in a villiform band. The first dorsal fin is triangular, and in advance of it is a short recumbent spine. The second dorsal fin has a fleshy prolongation, covering a part of the base of more than half of the anterior rays; the first ray is very short and spinous; the third, fourth and fifth longer than the others, and from these the rays rapidly diminish, becoming subequal for the remainder of the fin. The pectorals are placed slightly before the ventrals, are long and falcate. Ventrals in a deep cavity anterior to the commencement of the first dorsal fin. Anterior to the anal fin are two long spines concealed in a furrow. The first three or four rays are long; the remainder short, subequal. Caudal fin deeply furcate, with two carinæ or ridges on each side, embracing the spinous lateral plates of the tail; its lobes scaly. Deep golden green and blue above, which becomes more lustrous on the gill covers. Sides lustrous yellow, with green reflections. A small black spot—often wanting—on the edge of the opercles. Dorsals brown, tinged with yellow, and translucent at their bases; caudel fin olive-brown at base, yellow in middle, tipped with blackish-brown. Pectorals, ventrals and anal fin golden-yellow. Length, 6–8 inches.

Fin-rays:—D. 8, 1, 24; P. 20; V. 1, 5; A. 2, 1, 20; C. $19\frac{4}{4}$.

Scomber chrysos, Mitch. Trans. Lit. & Phil. Soc., New York, I. p. 124.

Caranx chrysos, DeKay, New York Faun. Fish, p. 121, pl. 27, fig. 85; Baird, Ninth Smiths. Rep., p. 336.

— *hippos*, Holbr. Ichth., S. Carol., p. 88, pl. 12, fig. 2.

— *pisquetos*, Cuv. & Val., IX, p. 97.

This fish is rather common in the quiet waters of Chincateague, Assateague and Wallop's Islands, and also in the southern part of Chesapeake Bay. Great numbers of them are caught in the hauling of the large seines, and are generally found entangled in the sea-weeds.

Acad. Coll.

BLEPHARICHTHYS, Gill.

B. crinitus,

Thread Fish. Hair Fish.

The body of this beautiful fish is almost orbicular, much compressed, acute on its edge, with a brilliant skin not covered with scales. The height of the body is 1⅔ of the total length; the length of the head, 3½. The unarmed lateral line is bent anteriorly, and becomes straight in the vertical from the middle of the soft dorsal. Eyes very large. Teeth in both jaws, forming villiform bands; lower jaw projecting. The first dorsal fin is but little developed, with short and rudimentary spines. The second dorsal fin has seven exceedingly long and filiform rays, and eleven bifid rays; the first of the filiform rays is 12 inches long, the other six successively shorter, and the bifid rays are low and subequal. Pectoral fins falciform; ventral long, narrow and pointed; anal fin with five filiform rays, varying from 4 to 6 inches in length, and the remaining eleven rays low and subequal; caudal fin deeply furcate. Bluish above, shining white beneath. The membrane between the anterior dorsal ray blackish. Opercular spot indistinct. Length, 5 inches.

Fin-rays:—D. 18; P. 17; V. 4; A. 16; C. 18.

Caranx sutor, Guenther, Catal. Fish., VI., p. 454.

? *Blepharis sutor*, Cuv. & Val. IX., p. 161.

— *major*, Cuv. & Val. IX., p. 163.

Zeus crinitus, Akerly, Am. Journ., Sc. XI., p. 144, with plate.

Blepharis crinitus, DeKay, New York, Fauna. Fish., p. 123, pl. 25, fig. 76.

But one specimen of this beautiful fish was obtained in the southern part of the Chesapeake Bay. It is not uncommon in the still waters around Chincateague, Assateague and Wallop's Islands, where it is called "Woman's Fish," probably on account of the long hair-like rays of the dorsal and anal fins.

ACAD. COLL.

HALATRACTUS, Gill.

H. zonatus.

Rudder Fish. Banded Mackerel.

The body of this fish is fusiform, subcompressed. The height of the body is 3½–4 times in the total length; the length of the head 3¾; the snout is rather elongate, conical, 2½ the diameter of the eye. The abdomen is broad and rounded. The scales are very small, with concentric striæ. The lateral line is curved, not concurrent with the back, forming a distinct ridge on each side of the tail. The double nostrils are vertically oval, adjacent, and nearly equidistant between the snout and the eyes. Numerous incurved card-like teeth in both jaws; in the upper jaw a small edentate space in front. The first dorsal fin spinous, subtriangular, lower than the second, and situated above the ventrals; the fourth ray longest, the last two scarcely appearing above the skin. The second dorsal slightly excavated on its upper margin. Pectorals short and broad. Ventrals long, large and stout, the tip extending to the vent; its posterior margin connected with the body by a delicate membrane. The anal fin commences under the eighteenth ray of the second dorsal, and is conterminous with that fin. Just anterior to the anal are two small distant spines, scarcely appearing above the skin. Caudal deeply forked. Silvery-blue on the back and sides, becoming of a faint greenish-yellow on the abdomen. An oblique black band from the spinous dorsal fin to the eye. Five, usually six, broad dusky bands nearly surround the body and tail, forming generally three black spots on the dorsal and two on the anal fins. Summit of the head dark blue, with a lighter colored space between the eyes. Eyes yellow. Both dorsal fins deep olive; ventrals bright olive-green; anals margined throughout with white. The colors of this fish are extremely fugacious, the belly and sides turning white a few minutes after death; the bands then extend over the dorsal and anal fins. Length, 7 to 10 inches.

Fin-rays: D. 7, 1, 35; P. 19; V. 6; A. 2, 19; C. $15\frac{5}{5}$.

Seriola zonatus, Mitch. Trans. Lit. & Phil. Soc., New York, I. p. 427, pl. 4, fig. 3.

— *zonata*, Cuv. & Val. IX, p. 213; DeKay, New York Fauna. Fish, p. 128, pl. 9, fig. 26; Holbr. Ichth. S. Carol, p. 73, pl. 10, fig. 1.

— *leiarchus*, Cuv. & Val. 1X, p. 213.

Specimens of this fish are occasionally found on the coast of Worcester county. (Wallop's Island.)

ACAD. COLL.

XXVIII—SCIÆNIDÆ.

MENTICIRRHUS, Gill.

M. nebulosus.

King Fish. Whiting. Hake. Barb.

Body elongated, cylindrical, tapering. The height of the body is $4\frac{2}{3}$ in the total length, the length of the head $4\frac{1}{2}$; the diameter of the eye is $7\frac{1}{2}$ in the length of the head, and $2\frac{1}{3}$

in that of the snout. Scales rounded, ciliated. Lateral line concurrent with the back, and near it. Snout produced, prominent and blunt. Opercle with two strong flat spines; preopercle serrated behind. A single cirrus on the point of the lower jaw, with four pores or fossæ. Teeth in the upper jaw long, acute, distant; in the lower short, even and crowded. First dorsal fin triangular, with the third spine very elongate; in some individuals equal to the length of the head, in others one-third of the total length. The second dorsal fin is separated from the first by a brief interval; its first ray is short and spinous, the remainder subequal. Pectoral fins broad and pointed, extending to the second dorsal fin, with a spinous triangular plate, covered by scales. Ventrals broad and rounded. Anal fin short, commencing under the eighth ray of the second dorsal fin. Caudal fin excavated above, rounded beneath; its upper tip pointed. Back and sides dark steel-grey, and, in certain lights, lustrous silvery and reddish. Abdomen bluish-white. In its dying struggles the whole fish displays frequent changes of beautiful colors. An oblique dark band from the nape to the side of the body, directed backwards, three oblique dark bands from the nape to the side of the body, directed backwards; three oblique dark bands from the back to the side, directed forwards; a dark longitudinal band along the middle of the tail. Caudal and pectorals olive brown. Ventrals and anal yellowish. Length, 12 inches.

Fin-rays:—D. 10, 1, 25; P. 16; V. 1, 5; A. 1, 8; C. 17^{3}_{3}.

Sciæna nebulosa, Mitch. Trans. Lit. & Phil. Soc. New York, I, 1815, p. 408, pl. 3, fig. 5.

Umbrina alburnus, Cuv. & Val. V. p. 180; DeKay, New York Fauna., Fish. p. 78, pl. 7, fig. 20; Baird, Ninth Smiths. Rep., p. 331.

Specimens of this fish are occasionally met with along the coast of Worcester county, and in the southern part of Chesapeake Bay. (Wallops Island.)

Acad. Coll.

XXIII—EPHIPPIIDÆ.

PAREPHIPPUS, Gill.

P. quadratus.

Moon Fish.

Body oblong, oval; the outline above the branchial aperture enlarged. Scales large, orbicular, and of a robust texture. Lateral line concurrent with the back. Eyes large. Nostrils double. Teeth conic, bristly, in numerous series. The dorsal fin is composed of eight and 1.21 softer rays. Caudal fin very wide, excavated on its margin. The first interspinous bone of the anal is club or mallet-shaped. Dark bluish-brown, with metallic lustrous reflections, and without spots or bands. The sides of the head tinged with lustrous green. Length, 15 inches.

Fin-rays :—D. 8, 1, 21 ; P. 16 ; V. 1, 5 ; A. 3, 18 ; C. 17^{3}_{3}.

Ephippus gigas, Cuv. & Val. VII, p. 121, pl. 204 ; DeKay, New York Faun., Fish. p. 99, pl. 23, fig. 71 ; Holbr. Ichth. S. Carol. p. 105, pl. 15, fig. 2.

XXXVII—ECHINEIDIDÆ.

ECHENEIS, Linn.

E. remora.

Sucker.

Body cylindrical, elongated. Length of the head about one-fifth of the total length. Head flattened above, with a disk extending from near the tips of the upper jaw to the ends of the pectorals, and nearly equal to one-third of the total length, with seventeen to eighteen pairs of bony laminæ, the edges of which are furnished with rows of minute tooth-like projections. Mouth wide and rounded; lower jaw longest.

A single band of small incurved teeth in the upper jaw, also on the vomer and tongue. Branchial aperture large Dorsal and anal opposite and co-equal. Pectoral small and rounded. Ventrals narrow, and with a membrane attaching them to the body. Caudal fin crescent-shaped. Dusky brown above; the under part of the body lighter. Fins darker than the rest of the body. Length, 12 to 18 inches.

Fin-rays :—C. 21 ; P. 22 ; V. 4 ; A. 20 ; C. 20.

Echeneis remora, L. Syst. I, p. 446 ; Lacep. III, pp. 146, 147, pl. 9, fig. 1 ; Mitch. Trans. Lit. & Phil. Soc. New York, I, p. 378 ; Richards. Faun. Bor. Amer., p. 265 ; DeKay, New York Fauna., Fish. p. 309.

Not uncommon on the coast of Worcester county. They are mostly found adhering to the bottom of vessels, which arrive from the open ocean, and also on such as traffic along the southern coast.

ACAD. COLL.

XXXVIIa—SPHYRÆNIDÆ.

SPHYRÆNA, Bloch.

S. borealis.

Northern Barracuda.

The body of this fish is elongated, subcylindrical. The height of the body is contained nine or ten times in the total length; the length of the head 3½; the diameter of the eye is one-eighth of the length of the head. The head is produced, flattened, smooth, channeled above; the operculum with a single point; eyes large and oval. Lower jaw longest, ending with a long, fleshy appendage. Teeth acute, pellucid; conspicuous in both jaws. In the lower jaw they are large, distant behind, and becoming smaller and more crowded towards the front, where two very large teeth are placed, and received in a cavity in the upper jaw, and numerous smaller ones along the edges of the intermaxillaries. Three long and slender teeth are on the palatines of each side, and beyond them numerous small ones; on the tongue are also numerous recurved teeth The two short dorsal fins are far apart; the first is triangular and commences at a point equidistant between the tip of the pectorals and the base of the ventrals. The second dorsal fin is slightly anterior to the origin of the anal; it is highest in front, emarginate, and has a slender, subspinous, simple ray in front. Pectorals short; ventrals feeble, short and rounded, placed under the first dorsal. Anal fin similar to the second dorsal, but somewhat higher. Caudal fin deeply forked. The living fish is green above, shining white beneath. The course of the continuous lateral line is indicated by a yellow line. Upper part of head olive brown, sides silvery. Young individuals are spotted with brown, and cross-bars of this color intersect the lateral line in some of the large specimens.

Fin-rays:—D. 5, 1. 9; P. 14; V. 1, 5; A. 19; C. 19^{4}_{4}.

Esox sphyræna, L. Gm. p. 1389.

Sphyræna sphyræna, Bl. taf. 389.

— *vulgaris*, Cuv. & Val. III, p. 327; Cuv. Regne. Anim. Ill. Poiss. pl. 18, fig. 1.

— *viridensis*, Cuv. & Val. III, p. 339.

— *guachancho*, Cuv. & Val. III. p. 342.

— *borealis*, DeKay, N. Y. Fauna. Fishes, p. 39, pl. 60, fig. 196.

This voracious fish is found in some seasons in great numbers along the coast of Worcester county. No specimens have as yet been obtained from the southern part of Chesapeake Bay.

Acad. Coll.

XLII—SCOMBERESOCIDÆ.

HEMIRHAMPHUS, Cuv.

H. unifasciatus.

Striped Skipper.

Long and slender; the length of head is contained twice and three-fourths or thrice in the total, (without caudal), the length of the lower jaw (beyond the extremity of the upper jaw) from five times and a half to six times and a half. The length of the head, without mandible, is contained thrice and a third in that of the trunk, without head and caudal. The triangular part of the upper jaw, formed by the intermaxillaries, is broader than long. The diameter of the eye is rather less than the width of the interorbital space, and two-thirds of the length of the postorbital part of the head. The root of the ventral fin is nearly midway between the eye and the base of the caudal. Dorsal and anal fins scaly, the former a little longer than the latter. Caudal fin moderately forked, the central rays being longer than the eye. Back, dark greenish; sides with a well-defined silvery band, as broad as a scale. Length, 8 to 14 inches.

Fin-rays:—D. 15–16; P. 13; V. 6; A. 16–17; C 18.

Hemirhamphus unifasciatus, Ranzani, Nov. Comm. Acad. Sc. Inst. Bonon. V, 1842, p. 326, tab. 25.

— *richardi*, Cuv. & Val. XIX, p. 26.

— *tricuspidatus*, Gill, Proc. Acad. Nat. Sc. Philad. 1859, p. 131.

Not uncommon in the southern part of Chesapeake Bay.

ACAD. COLL.

XLV—CYPRINODONTIDÆ.

CYPRINODON, Lac.

C. variegatus.

The Sheepshead Killifish.

Elliptical, body much compressed ; its height is contained twice and one-eight to twice and one-third in the total length, (without caudal,) the length of the head thrice and one-fourth. Scales large, subquadrate, longest in their vertical diameter, rounded and entire on their free edges ; on the summit of the head is a central scale, with its entire margin free. The scales extend over the cheeks, form an imperfect sheath for the dorsal fin, and extend far up the caudal fin. The humeral scale (behind the gill opening,) is three or four times as large as the others. Lateral line scarcely obvious. Snout very obtuse, the upper mandible being directed obliquely upwards ; head much flattened between the eyes, which are distant. Dorsal and anal of moderate size, very much higher in males than in females and young males, but only extending to the middle of the tail when laid backwards. Pectorals pointed, placed low on the body. Ventrals very feeble. Caudal broad and short, nearly even ; its margin slightly excavated. Back dark green, becoming lighter towards the sides. Males without black spots on the body ; caudal and sometimes the other fins black edged. Females with irregular blackish or black vertical spots on the body ; fins without black margin ; a black stripe across the root of the caudal. Length, 2 to 2½ inches.

Fin-rays :—D. 10–11 ; P. 15 ; V. 7 ; A. 10–11 ; C. $15\frac{3}{5}$.

Cyprinodon variegatus, Lacep. V, pp. 486, 487, pl. 15, fig. 1.

Esox ovinus, Mitch. Trans. Lit. & Phil. Soc. New York, 1815, I, p. 441, pl. 4, fig. 7.

Lebias ellipsoidea, Lesueur, Journ. Acad. Nat. Sc. Philad. II, 1821, p. 6, pl. 2.

— *rhomboidalis,* Valenc. in Humb. Obs. Zool. II, p. 160.

Cyprinodon ovinus, Valenc. in Humb. Obs. Zool. II, p. 164.

Lebias ovinus, DeKay, New York Fauna. Fish., p. 215, pl. 17, fig. 84.

This beautiful little fish seems to be quite common, both along the coast of Worcester county and in the Chesapeake Bay. It prefers shallow and quiet water, that readily becomes warm by the rays of the sun. In such places it swarms in shoals. Its peculiar robust body, so brightly marked in the females, quickly attracts the attention of the observer.

ACAD. COLL.

XLVII—SYNODONTIDÆ.

SYNODUS, (Gron.) Bl. Schn.

S. foetens.

Providence Whiting.

Body elongated, subcylindrical, tolerably stout, a little depressed, covered with scales of moderate size. Length of the head one-fourth of the total, (without caudal). Head oblong; the snout pointed, as long as broad. Mouth very large, cleft of mouth very wide; lower jaw shorter than the upper, and when the mouth is shut, leaving the teeth of the upper exposed. Crown of the head with a few smooth striæ, radiating from the hind part of the orbit. Interorbital space slightly concave. Intermaxillary very long, styliform, tapering; maxillary thin, long, closely adherent to the intermaxillary. Teeth cardiform, some elongate, slender; all can be laid downwards and inwards; teeth in the jaws, on the tongue, and on the palatine bones; those on the palate form a single band on each side. Gill opening very wide. Eye of moderate size. The short pectoral fin extends to the twelfth scale of the lateral line. The ventral to the twelfth or fourteenth of the median series commencing behind its base, its inner rays being much longer than the outer ones; this fin is inserted before the dorsal, not far behind the tip of the pectorals, when laid back. Dorsal fin higher than long, nearly in the middle of the length of the body; adipose fin small. Anal fin short. Caudal forked. Back and sides above mottled reddish or olive-brown, varying much in tint; sides below lateral line paler; belly faint yellow. Length, 12 to 26 inches.

Fin-rays:—D. 11.0; P. 14; V. 8; A. 12; C. 20.

Saurus fœtens, Catesby, South Carolina, II, p. 2, tab. 2, fig. 2.

Salmo fœtens, L. Syst. Nat. I, p. 513.

Saurus fœtens, Cuv. & Val. XXII, p. 471; Holbr. Ichth. S. Car., p. 187, pl. 26, fig. 1.

It is a very common fish in the tide water of both shores of the southern end of the Eastern shore. Quietly resting on the sand, it darts away with great rapidity if disturbed.

ACAD. COLL.

XLVIIa—MICROSTOMIDÆ.

OSMERUS, Artedi.

O. mordax.

American Smelt.

Body elongated, cylindrical, tapering gradually towards the head and tail. The large scales are oval, and number sixty-six in the transverse series above the lateral line. This line is straight, and not concurrent with the dorsal outline. Head smooth, sloping, more than one-fifth of the total length. Nostrils large, double, contiguous, nearly equidistant between the eyes and end of the snout. Eyes large. Lower jaw longer than the upper, armed with strong, acute, recurved teeth. Tongue with two or three long teeth on each side, with a larger one in front near the tip; palatines with a row of smaller teeth. The first dorsal fin, commencing at a point midway between the base of the caudal fin and the tip of the snout, has the first two rays simple, the first very short, the second longest, thence very gradually diminishing to the last. The long and narrow adipose dorsal fin is over the posterior third of the anal. Pectorals pointed and fan-shaped; ventrals broad, arising under the first ray of dorsal fin; anal long, with anterior ray longest; caudal forked. Pale olive-green above the lateral line. Opercles and sides silvery. Upper part of the opercles, near the nape, dark green. Length 5–8 inches.

Fin-rays:—D. 11.0; P. 14; V. 9; A. 15; C. 19^{5}_{5}.

Salmo eperlanus, Mitch. Lit. & Phil. Trans. N. York, I, p. 435.

Osmerus viridescens, Lesueur, Jour. Acad. Nat. Sc. Philad. I, p. 230; DeKay, N. York Fauna. Fish., p. 243, pl. 39, fig. 124; Cuv. & Val. XXI, p. 388.

This fish, well known as Smelt from its peculiar smell, resembling that of cucumbers, belongs to the northern part of the Atlantic; specimens have been taken occasionally in the inlet between Assateague and Wallops Islands.

ACAD. COLL.

LII--CLUPEIDÆ.

CLUPEA, Linn.

C. harengus.

English Herring. Herring of Commerce. Common Herring.

Body lengthened, fusiform, compressed. The height of the body nearly equal to the length of the head. Depth at the dorsal fin to the length as one to fourteen. Back slightly arched. Lower jaw prominent, mouth large. Head destitute of scales, with a depression above. Jaws, palate and tongue furnished with teeth, though frequently rudimental or entirely absent in old specimens. Scales large, silvery and deciduous. Abdomen sharp, and indistinctly serrated, with about thirteen scutes behind the ventrals. Dorsal subquadrangular, longer than high. Pectorals short, rounded. Ventrals inserted below the middle of dorsal fin. Anal subequal, narrow, highest in front. Caudal small, forked, with pouches. Back and head deep blue, tinged with yellow. Opercles yellowish, tinged with violet. Irides silvery; pupils black. Length, 12 to 13 inches.

Fin-rays:—D. 17–20; P. 18; V. 9; A. 16–18; C. 22^{3}_{3}.

Clupea harengus, L. Syst. Nat. I, p. 522; Mitch. Americ. Monthl. Mag. II, p. 323; Richards. Franklin's Jour., p. 716, and Faun. Bor. Amer. III, p. 229.

— *elongata*, Lesueur, Jour. Acad. Nat. Sc. Phil. I, p. 234; Storer, Rep. Fish. Massach. p. 111; DeKay, New York Faun. Fish. p. 250; Storer, Mem. Am. Ac. VI, p. 330, pl. 26, fig. 1.

This well known herring is found in some seasons, and chiefly those following a severe winter, in the ocean off Worcester county, though not often in very great numbers. Whether this is owing to the fact, that seines are hauled rather seldom in early spring, or that they prefer the more northern parts of the Atlantic, is questionable. The fishermen of Chincateague Island say, that they are sometimes seen in large shoals.

ACAD. COLL.

LXIXa—SPHYRNIDÆ.

SPHYRNA, Raf.

S. zygœna.

Hammer-Head Shark.

This fish has a cylindrical, elongated body. The surface is rough when rubbed forwards; under the lens it appears to be covered with plates, fluted with minute deep parallel striæ. Head three times broader than long; it is elongated transversely, somewhat convex; the anterior margin describing irregularly the arc of a large circle; the posterior margin is rendered straight, thin and submembraneous, by an expansion of the integuments; the lateral margin forming almost a right angle with the anterior edge. Eyes large, and furnished with a lid which is attached to the internal portion of the base of the orbit; the eyes are placed near the angle formed by the anterior and lateral margins, in such a manner as to enable the animal to look above and beneath. Nostrils placed in a deep notch near the angle; they form an oblique slit, partially covered by an acutely pointed process, which is continued by a long and deep furrow along the anterior margin. Mouth crescent shaped, with three rows of white hyaline teeth above and below. Teeth above triangular, acute, not serrated; their tips directed outwards from the centre, with a shoulder on the outer side; in the centre, a few shoulders on both sides. All the branchial apertures short and small; the posterior smallest, and placed over the base of the pectorals. The first dorsal quadrilateral; second dorsal rhomboidal, very small. Pectorals low down, subtriangular, broad, distant and slightly concave behind. Ventrals small, broad, nearly midway between the first and second dorsals. Anal somewhat larger, but similar in shape to the second dorsal. Caudal equal in length to the transverse diameter of the head; the lower lobe short, the upper with a small triangular lobe near its tip. Uniform dusky grey, with a very slight tinge of reddish brown; cinereous beneath. Length, 4 to 10 feet.

Squalus zygæna, L. Syst. Nat. p. 399; Mitch. Trans. Lit. & Phil. Soc. N. York, I, p. 284.

Zygæna malleus, Shaw, Nat. Misc. pl. 267; DeKay, N. York Faun. Fish. p. 362, pl. 62, fig. 204; Storer, Proc. Bost. Soc. Nat. Hist. I, p. 36.

Cestracion zygæna, Gill, Ann. Lyc. Nat. Hist. New York, VII., p. 403.

This pecular shark was very common last summer in the mouth of Miles River, in fact so much so, as to force the fishermen to abandon that ground.

LXXa—SCYLLIIDÆ.

GINGLYMOSTOMA, Mueller & Henle.

G. cirratum.

Southern Nurse Shark.

This peculiar Shark has somewhat the shape of a Cat-fish; it has two dorsal fins, without spines; the first is situated above the ventrals; the second somewhat in advance of the anal. The eyes are very small, and behind them the minute spiracles. Nasal and buccal cavities confluent. The nasal valves of both sides form one quadrangular flap in front of the mouth, each being provided with a free cylindrical cirrhus, which reaches the lower lip. An upper and lower lip, the latter not extending across the symphysis. The fourth and fifth gill openings close together. Teeth of both jaws in many series, small, each with a strong median cusp, and one or two much smaller cusps on each side. The angles of the dorsal, anal, and pectoral fins obtusely rounded. Length of the caudal fin one-third, and in young specimens two-sevenths of the total length. Uniform brownish; young specimens with scattered small, round, black spots. Length, 3 to 8 feet; that of captured specimen about 3 feet.

Squalus cirratus, Gm. L. I, p. 1492; Lacep. I, p. 245.

Ginglymostoma cirratum, Mueller & Henle, p. 23.

— *fulvum*, Poey, Mem. Cub. II, p. 342, and Repert. Fis. nat. Cub. 1868, p. 455.

Only one specimen of this curious fish, the first one recorded as being caught on the coast of the United States, was obtained in the southern part of the Chesapeake Bay; the usual habitat of this Shark is the Atlantic coast of South America. Its peculiar shape is well adapted for its mode of live, that of a mud-fish.

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FISH AND FISHERIES.

PUBLIC GENERAL LAWS.

Chapter 47 *of Laws of* 1876, *repeals Sections* 4 *and* 6 *of Chap.* 150 *of Laws of* 1874, *and re-enacts the same with amendments.*

Appointment of Commissioners of Fisheries.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That the Governor, by and with the advice and consent of the Senate, is hereby authorized to appoint two competent persons, who shall continue in office for two years from the time of their appointment, and until their successors are appointed, who shall be known as Commissioners of Fisheries of Maryland, and that one of the commissioners shall come from the Eastern and one from the Western Shore of the State.

Duties of.

Sec. 2. *Be it enacted*, That it shall be the duty of said Commissioners to immediately proceed to inspect all the waters of this State, with a view of stocking the same with such food fishes as in their judgment shall be most advantageous, and with such object shall communicate with the Commissioner General of Fisheries of the United States, and with the Commissioners of Fisheries appointed by the different States, and report the result of their inspection to the Governor of this State as soon as practicable, and that they examine into the feasibility of cutting a channel around the Great Falls of the Potomac to admit the passage of fish from tide water into the upper Potomac, and that they also inquire into the expediency of constructing fish-ways or fish-ladders to admit the passage of fish over dams or other obstructions in the upper Potomac, or elsewhere in the State, and that an estimate of cost, be made, and a report thereof be made to the next General Assembly of Maryland.

Report.

Duty of.

Sec. 3. *Be it enacted,* That it shall be the duty of the said Commissioners of Fisheries, after making the inspection and obtaining the information required in the preceding section, to proceed to the selection of proper locations for the propagation and culture of such food fishes as it shall be deemed desirable to introduce into the waters of this State, and obtain the necessary ova, and construct and erect suitable houses and devices for hatching the same, and protecting the small fish, until fit to be distributed, and then to distribute the same among such waters of this State as shall be deemed proper.

To obtain ova, and construct houses for hatching &c.

Laws of 1876, *Chapter* 47, *Section* 4

Annual report.

Sec. 4. It shall be the duty of said commissioners to make an annual report to the Governor of the work accomplished by the commission, and also embracing such suggestions for the protection and propagation of the food fishes in the waters of this State, as may be the result of their observation and experience, which report the Governor shall cause to be printed, and transmit the same to the General Assembly of the State.

Laws of 1874, *Chapter* 150, *Section* 5.

Salaries of.

Sec. 5. *Be it enacted,* That the salaries of said Commissioners shall be fifteen hundred dollars per annum each, and that the sum of three thousand dollars per annum, be and the same is hereby appropriated to pay the said salaries.

Laws of 1876, *Chapter* 47, *Section* 6.

Appropriation.

Sec. 6. The further sum of ten thousand dollars per annum, or so much thereof as in the opinion of the Governor be necessary, be and the same is hereby appropriated for the purpose of carrying out the provisions of this act, and the Comptroller shall issue his warrant on the Treasurer for the payment of the said sum on requisitions of the said commissioners in such amounts as they may require, approved by the Governor, out of any moneys in the Treasury not otherwise appropriated.

PATAPSCO RIVER.

Section 1, *Chapter* 204 *of the Laws of* 1876, *repeals Section* 6 *of Chapter* 79 *of Laws of* 1874, *which limits the action of said Law to the* 1st *day of April,* 1876. *This Section makes it perpetually in force from the date of its passage.*

FISH AND FISHERIES.

Public Local Laws.

CAROLINE COUNTY.

Laws of 1876, *Chapter* 218, *Sections* 1, 2, 3 *and* 4.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful to haul a seine of any description whatever, in the waters of the Choptank river and its tributaries, for the purpose of catching fish, from and after the twentieth day of May, in each and every year to the first day of August.

Not lawful to haul seine.

Sec. 2. *And be it enacted*, That nothing in this act shall conflict with, or repeal any of the provisions of the act of eighteen hundred and seventy-four, chapter four hundred and sixty-six relating to fisheries.

Not to conflict with.

Sec. 3. *And be it enacted*, That any person or persons violating either of the foregoing sections of this act, upon conviction thereof before a justice of the peace residing in either of the Counties of Dorchester, Talbot or Caroline opposite the shores where the offence is committed, shall be fined not less than ten dollars nor more than twenty-five dollars for each offence, to be collected in the same manner and by the same process of law as other fines or small debts are collected.

Violating

Penalty for.

Sec. 4. *And be it enacted*, That any person or persons refusing or neglecting to pay such fine or fines, when imposed by any justice of the peace who has jurisdiction in such cases, the seine or boat, or both shall be liable to seizure, and upon ten days notice being given, shall be sold and a sufficiency of the proceeds of the sale shall be

Refusal to pay.

appropriated to the payment of the fine and costs, the balance, if any, shall be paid over to the owner or owners of said seine and boat, and nothing in this act shall be so construed as to deny to the defendant or defendants in all such cases the right of appeal to the Circuit Court of the district wherein such offence is committed; provided the defendant or defendants shall demand an appeal within ten days from the date of judgment.

CECIL COUNTY.

Section 1, *Chapter* 388 *of Laws of* 1874, *is repealed by Section* 1, *Chapter* 280 *of the Laws of* 1876, *which re-enacts the same with amendments.*

Laws of 1876, *Chapter* 280, *Section* 1.

Not to fish.

Sec. 1. No person or persons shall fish at any time in the waters of Elk River and North East River and their tributaries, lying and being within the limits of Cecil county, with any hauling seine of any description, the meshes of which are of a less measure than what is generally known as inch and a quarter mesh; provided however, that this section shall not apply to any established fishing shore on said waters, fishing for herring and shad, from the fifteenth day of March to the tenth day of June of each year.

Proviso.

Laws of 1874, *Chapter* 388, *Section* 2.

Violating.

Sec. 2. *And be it enacted*, That any person or persons violating the provisions of this act, upon conviction thereof before any justice of the peace in Cecil county, shall pay a fine of twenty dollars, and forfeit such seine and the boats and materials used in fishing the same, which shall be sold at public auction for cash, one-half of said fine and the proceeds of said sale shall go to the officer making the arrest, and the other half to the public school fund of said county.

DORCHESTER COUNTY.

See Chapter 218 *of the Laws of* 1876, *as in Caroline County.*

Laws of 1876, *Chapter* 378, *Sections* 1, 2 *and* 3.

Sec. 1. *Be it enacted by the General Assembly of Maryland,* That it shall be unlawful for any person or persons to use seines, or any nets that are attached to stakes or any other permanent fixture, or the use of patent twine weirs, for the taking of fish in the waters of Black Water River, in Dorchester county. Unlawful.

Sec. 2. *And be it enacted,* That any person or persons, who may violate the provisions of this act, shall, upon conviction thereof, before any justice of the peace of said county, be fined for each and every offence the sum of twenty-five dollars, and the condemnation and forfeiture of the seines, nets, twine, weirs and boats or canoes, used in the violations as provided in section one, of this act, one-half of the fines and forfeitures to go to the informer, the remainder to be paid into the free school treasury of Dorchester county, for the use of said schools. Penalty for violation.

Sec. 3. *And be it enacted,* That the justice of the peace making the condemnation under this act, shall give at least ten days' notice as to the time and place and terms of sale, with the right of appeal in all cases reserved to the defendant. Give notice.

GARRETT COUNTY.

Laws of 1876, *Chapter* 210, *Section* 1.

Sec. 1. *Be it enacted by the General Assembly of Maryland,* That from and after the passage of this act, it shall not be lawful for any person to take, catch or kill any speckled brook or river trout, or to have any such trout in his or her possession except during the months of May, June and July, under penalty of five dollars for each trout so caught or had in his or her possession, but this section shall not prevent any person or corporation, from catching trout in any manner, or at any time, in waters owned by them or upon their premises, to stock other waters. Not lawful. Penalty.

HARFORD COUNTY.

Section 1, *Chapter* 215, *Laws of* 1876, *adds as additional, Sections to Article* 12 *of the Code of Public Local Laws, as Section* 41 *A, Section* 41 *B, and Section* 41 *C, the following:*

Unlawful. Sec. 41 A. It shall be unlawful for any person to catch or trap any fish in the waters of Harford county, the waters of the Chesapeake Bay and its tributaries to high tide, and the Susquehanna River and private fish ponds excepted; Proviso. provided, that nothing in this section shall apply to the waters of Gunpowder River, Bush River and Swann Creek and their tributaries.

Sec. 41 B. Any one violating the provisions of the preceding section, shall, upon conviction before a justice of the peace of said county, be liable to Penalty. a fine of not less than two dollars and fifty cents, nor more than five dollars for each offence, and upon failing to pay said fine and the cost of prosecution, shall be sentenced to imprisonment in the county jail, for a period not exceeding seven days; said fine to be paid to the county commissioners for the use of the county.

Sec. 41 C. *And be it enacted*, That this act shall In force. continue in force for two years from the date of its passage.

KENT COUNTY.

Laws of 1876, *Chapter* 41, *Sections* 1, 2, 3, 4, 5, *and* 6.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any person or persons to lash or beat the waters of To protect fish and wild-fowl. Fairlee Creek, Worton Creek, Lloyd's Creek, Still Pond Creek, Churn Creek, Turner's Creek or any other of the creeks or arms of the Sassafras river within the bounds of Kent county in this State, with rods, poles or sticks or anything else, or to make noises on the decks of any boat, or on any part of any boat by the use of clogs or wooden shoes, or by any other instrument or means or in any other manner for the purpose of driving fish into any seine, fish-basket or any other contrivance for catching fish, nor for the purpose, or which will have the effect of driving or frightening wild ducks or water-fowls of any description from their feeding or roosting grounds in the waters hereinbefore described of said county.

Sec. 2. *And be it enacted,* That any person violating any of the provisions of the preceding section, shall pay a fine of not less than ten nor more than one hundred dollars, and forfeit the boat together with her tackle and apparel, and her seine and all other property on board of her at the time of her seizure.

Fine and penalty

Sec. 3. *And be it enacted,* That on information given on oath to a justice of the peace of said county most adjacent to the waters in which it is claimed a violation of the first section of this law is being or has been committed, he shall issue his warrant for the arrest of the offender or offenders and the seizure of the boat, together with all her tackle apparel and all other property on board and in their possession, which warrant shall be directed to the sheriff or some constable of said county, and the sheriff or such constable may summon the *posse comitatus* to aid him in making any arrest and seizure authorized by this act.

Issue warrant.

Sec. 4. *And be it enacted,* That upon the arrest of the offenders they shall be taken before a justice of the peace most adjacent to the waters in which the offence has been committed, and tried, and if found guilty shall pay a fine of not less than ten nor more than one hundred dollars, to be recovered as other small debts are now recovered, and the said justice shall condemn all property seized by the officer making the arrest, which shall appear in proof to have been in the possession of the parties found guilty, or used by them in violation of the first section of this act, and adjudge and decree the same to be sold.

Fine—how recovered.

Sec. 5. *And be it enacted,* That the property so as aforesaid condemned, shall be sold by the officer making the seizure on ten days' notice by either written or printed advertisement placed in four public places, and the proceeds of sale after deducting the costs of the proceedings and the expenses of sale, shall be divided as follows: one-fourth to the officer making the seizure, and the residue to be divided equally among the persons who aided him in making such seizure.

Notice of Sale.

Fine—how divided.

Sec. 6. *And be it enacted*, That any party who has been adjudged guilty of a violation of the provisions of this act and feels himself thereof aggrieved, shall have the right of appeal to the Circuit Court of the said county.

Right of appeal.

SOMERSET COUNTY.

Laws of 1876, *Chapter* 168, *Sections* 1, 2 *and* 3.

Sec. 1. *Be it enacted by the General Assembly of Maryland*, That it shall not be lawful for any non-resident of the State to take or catch fish in any manner or way in the waters of the Wicomico river without first obtaining from the Clerk of the Circuit Court of either Wicomico or Somerset county a license therefor, which license shall be granted upon payment to said clerk, for the use of the State of Maryland, the sum of thirty dollars, said license shall be in force for one year from date of granting and shall be confined to the boat or vessel therein named; any person not a resident of the State, violating this section, shall upon conviction before any justice of the peace of the State of Maryland, be subject to a fine of not less than fifty nor more than one hundred dollars and forfeit the boat or vessel and nets, seines or tackle so used in taking fish, the proceeds of said fine and forfeited property, after payment of officers fees, to be paid to the Clerk of the Circuit Court of the county where tried, for the use of the State.

Not lawful.

Penalty.

Sec. 2. *And be it enacted*, That upon information of any person, made to any justice of the peace of either of said counties, the said justice shall issue his warrant to some constable or sheriff for the arrest of persons violating the preceding section and have the said person or persons brought before him for trial.

Issue warrant.

Sec. 3. *And be it enacted*, That any party or parties against whom any justice of the peace may render a judgment under this act, either to pay a fine or condemnation of property, may at any time within ten days from the rendition of such judgment, appeal from such judgment to the Circuit Court for said counties respectively; but no execution or sale shall be stayed unless the party appealing shall give bond, with security to the State of Maryland, in double the value of the

Appeal.

Give bond.

property condemned or of the fine imposed as the cases may be, said security or securities to be resident or residents of the State, who shall swear or affirm that he or they are worth double the amount of the property condemned, with condition to prosecute such appeal with effect, and to pay the value of the property condemned and fine imposed and all costs attending such proceedings, in case such judgment shall be confirmed, and in all cases of appeal either party shall be entitled to trial by jury.

TALBOT COUNTY.

Chapter 218, *Laws of* 1876, *regulates fishing in Choptank River and its tributaries, See Caroline County.*

WICOMICO COUNTY.

Chapter 168, *Laws of* 1876, *protects Fish in the Waters of Wicomico River from non-residents, See Somerset County.*

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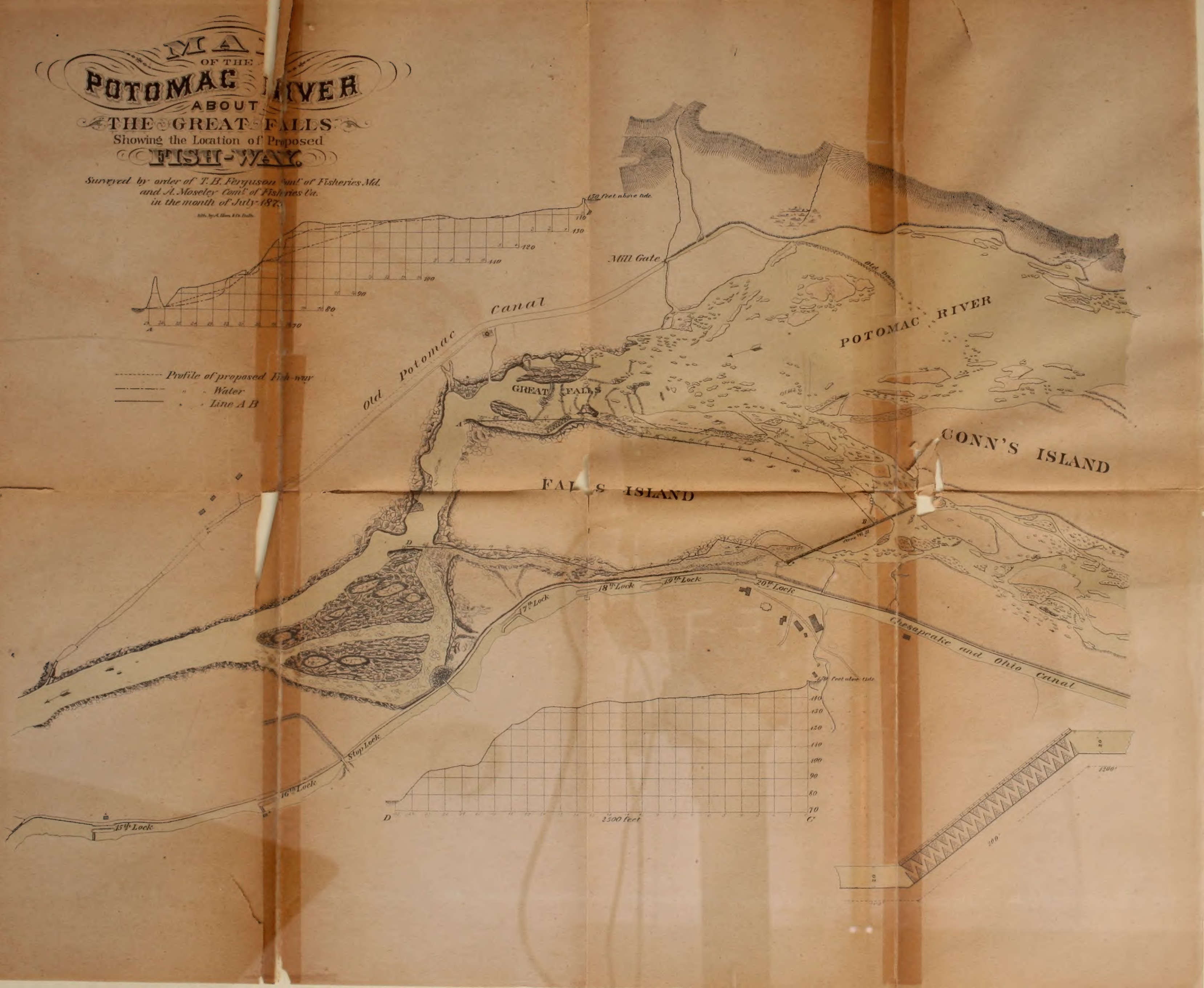

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